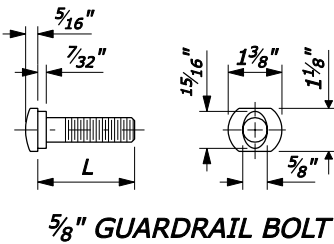


RAIL ELEMENT ELEVATION

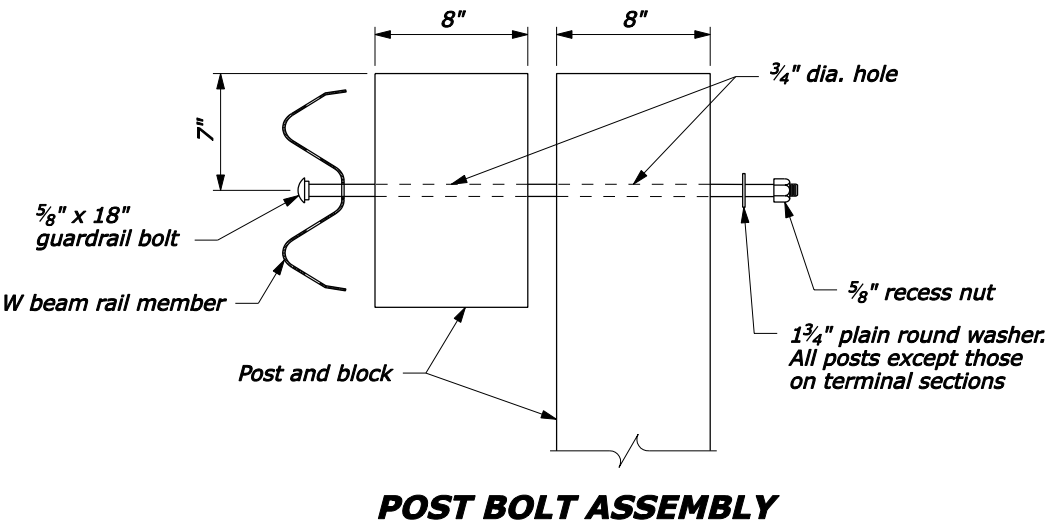
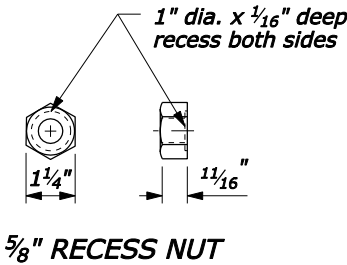
SECTION A-A

W BEAM RAIL MEMBERS



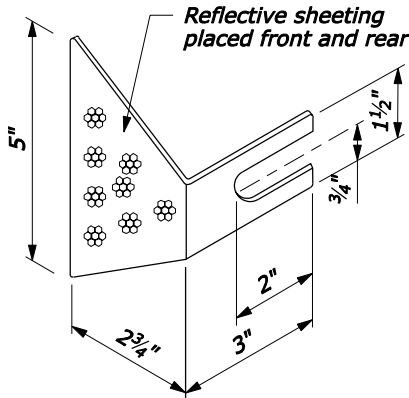
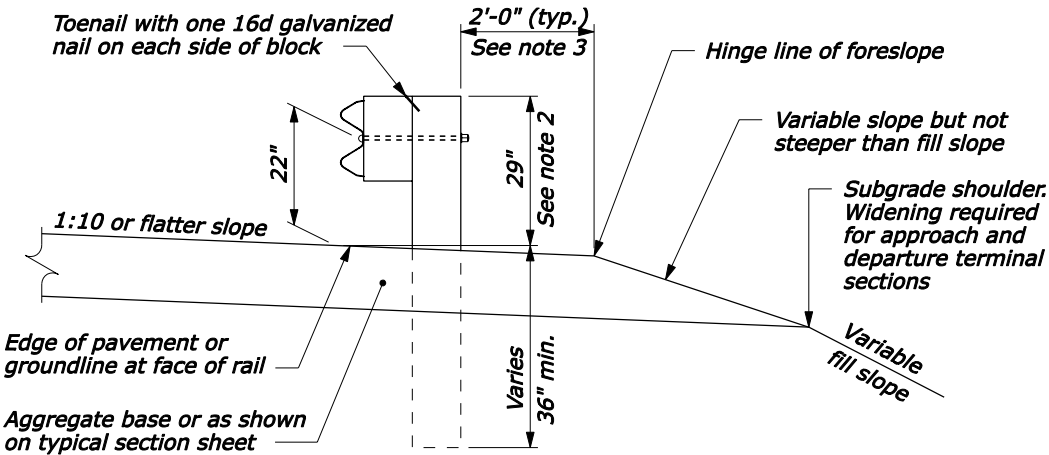
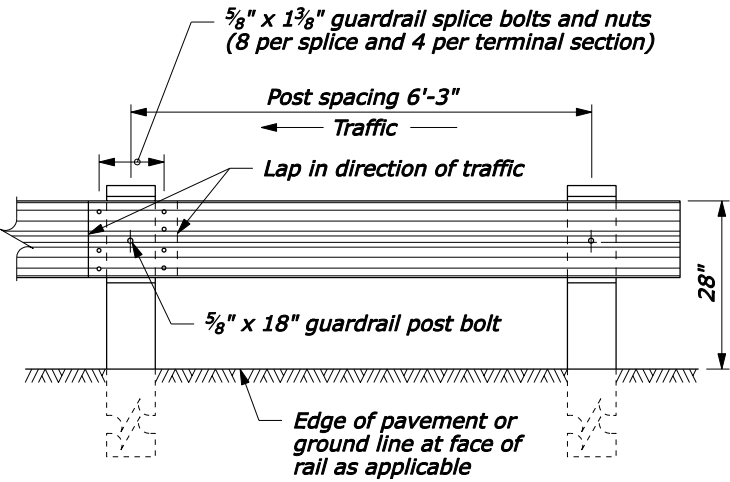
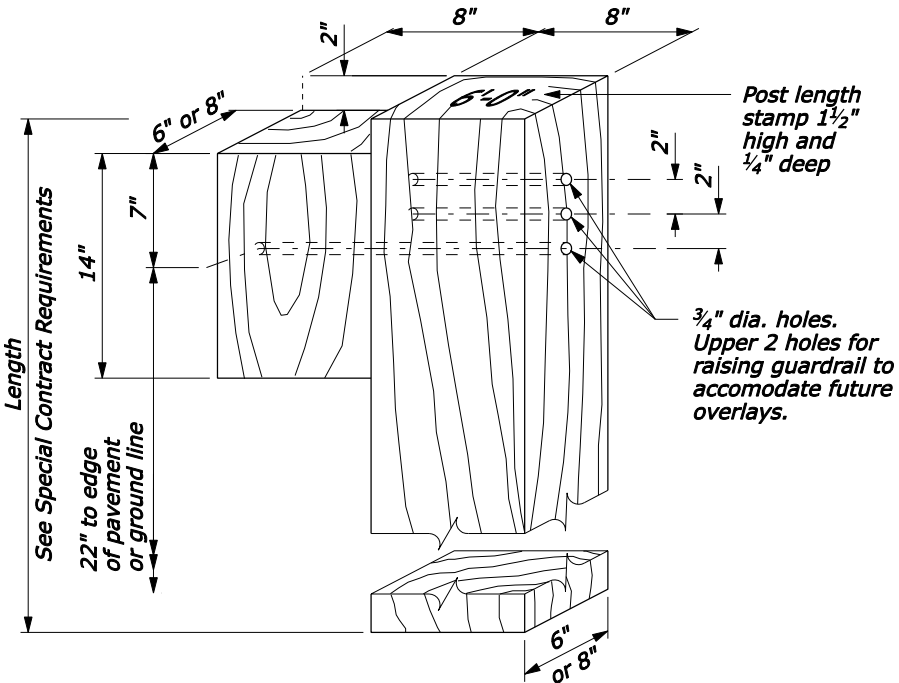
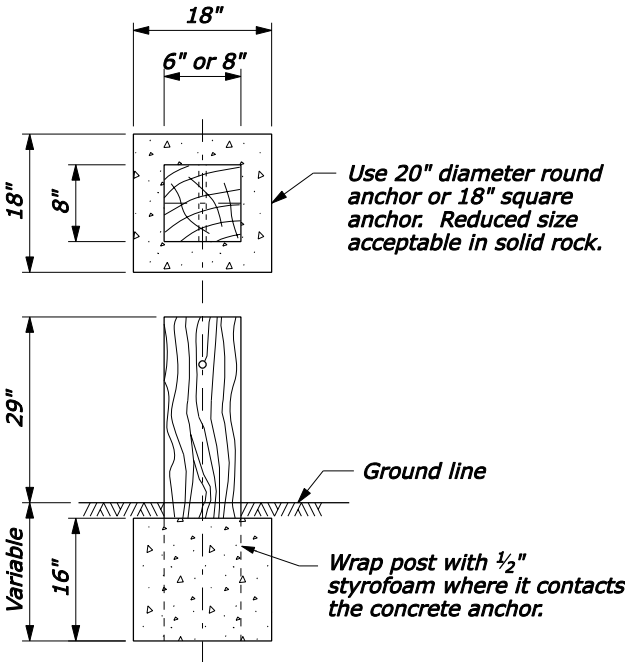
L	Thread Length
1 3/8"	1 1/8" minimum
2"	1 3/4" minimum
10"	4" minimum
18"	4" minimum
25"	4" minimum

GUARDRAIL BOLT AND RECESS NUT



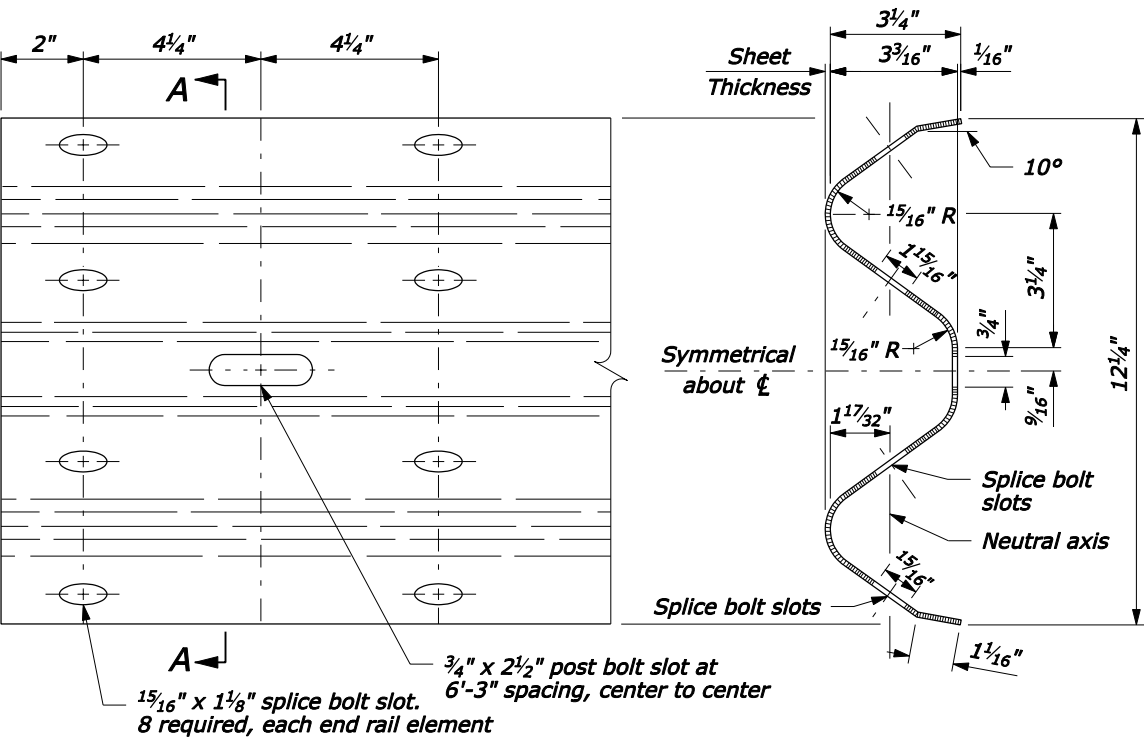
NOTE:

1. Use no more than 3 short guardrail posts in a row.
2. If directed to use alternate hole arrangement, post above ground shall be 31" tall.
3. See Special Contract Requirements when 7'-0" or longer posts are specified.
4. Install reflector tab between post bolt and rail, every fourth post. Alternate reflector tab shapes are acceptable.
5. Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance, and accepted manufacturing practices.



NO SCALE

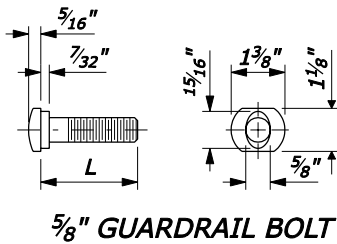
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD	
G4 W-BEAM GUARDRAIL WOOD POSTS	
STANDARD APPROVED FOR USE 1/1994 REVISED: 4/1994 6/2005	STANDARD 617-10



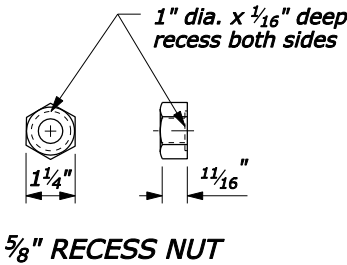
RAIL ELEMENT ELEVATION

SECTION A-A

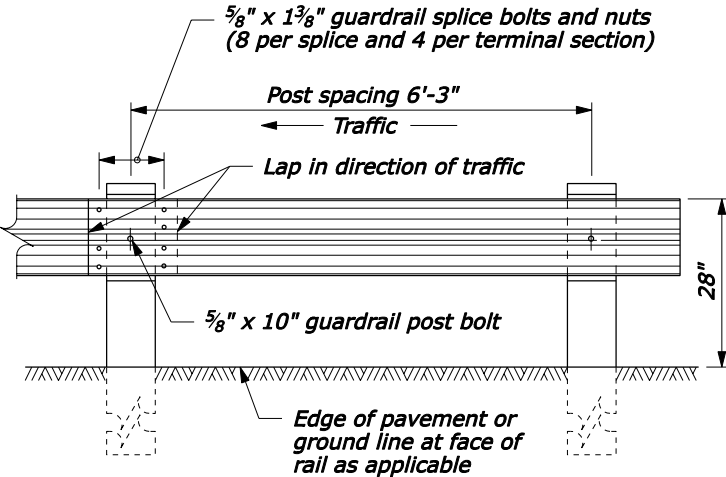
W BEAM RAIL MEMBERS



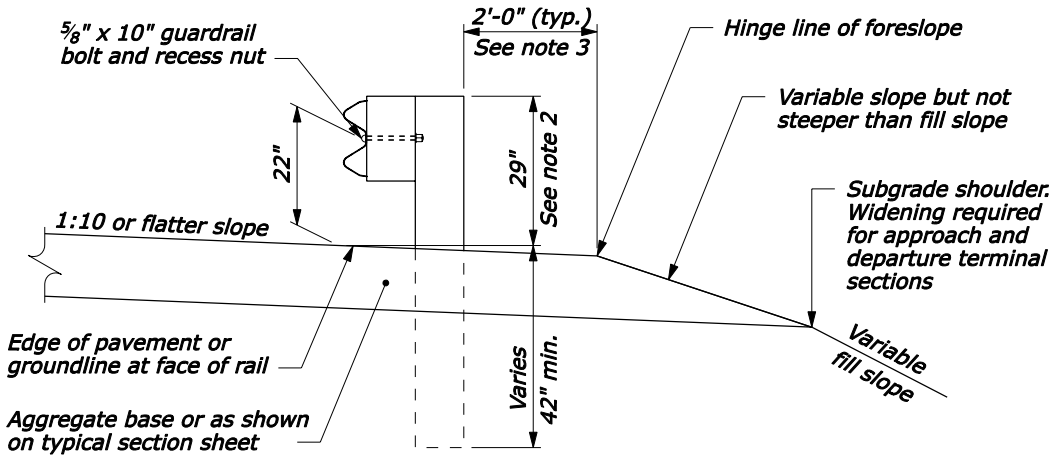
L	Thread Length
1 3/8"	1 1/8" minimum
2"	1 3/4" minimum
10"	4" minimum
18"	4" minimum
25"	4" minimum



GUARDRAIL BOLT AND RECESS NUT

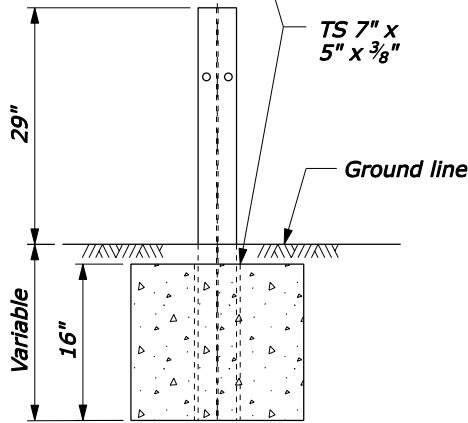


POST SPACING
STANDARD POST SECTION

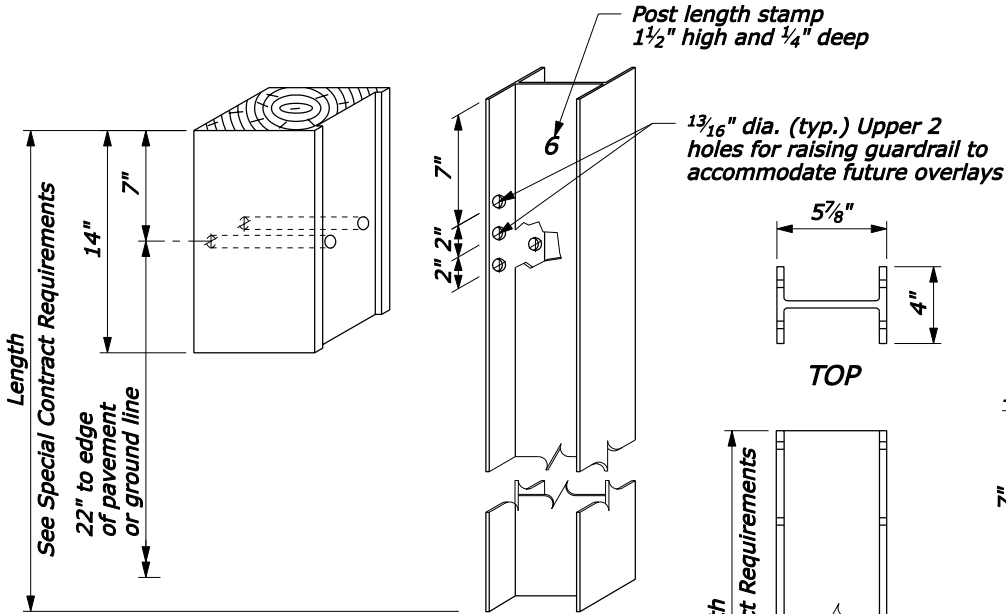


TYPICAL GUARDRAIL CROSS SECTION

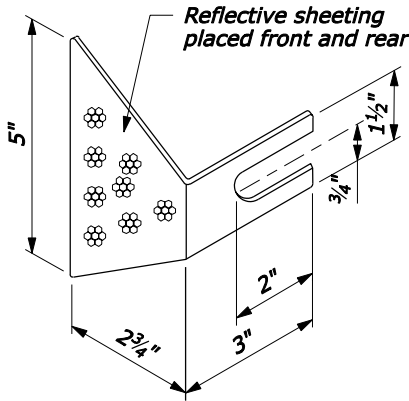
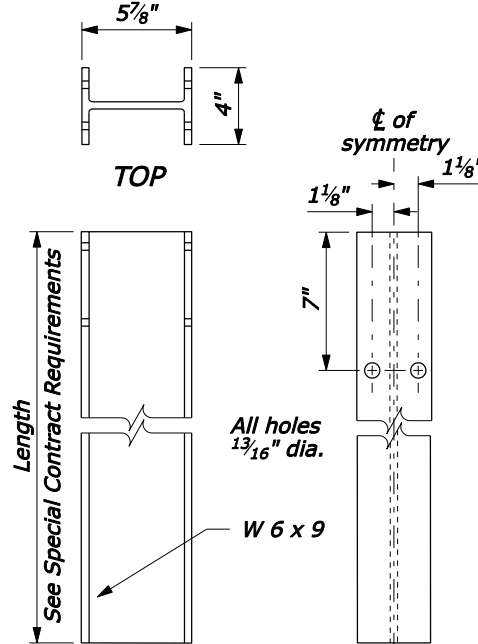
CONCRETE ANCHOR FOR
SHORT GUARDRAIL POST
(See Note 1 and 2)



ALTERNATE HOLE ARRANGEMENT
POST AND BLOCK DETAIL



STRUCTURAL SHAPE POST



REFLECTOR TAB
(See Note 4)

NO SCALE

NOTE:

1. Use no more than 3 short guardrail posts in a row.
2. If directed to use alternate hole arrangement, post above ground shall be 33 inches tall.
3. See Special Contract Requirements when 7'-0" or longer posts are specified.
4. Install reflector tab between post bolt and rail, every fourth post. Alternate reflector tab shapes are acceptable.
5. Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance, and accepted manufacturing practices.

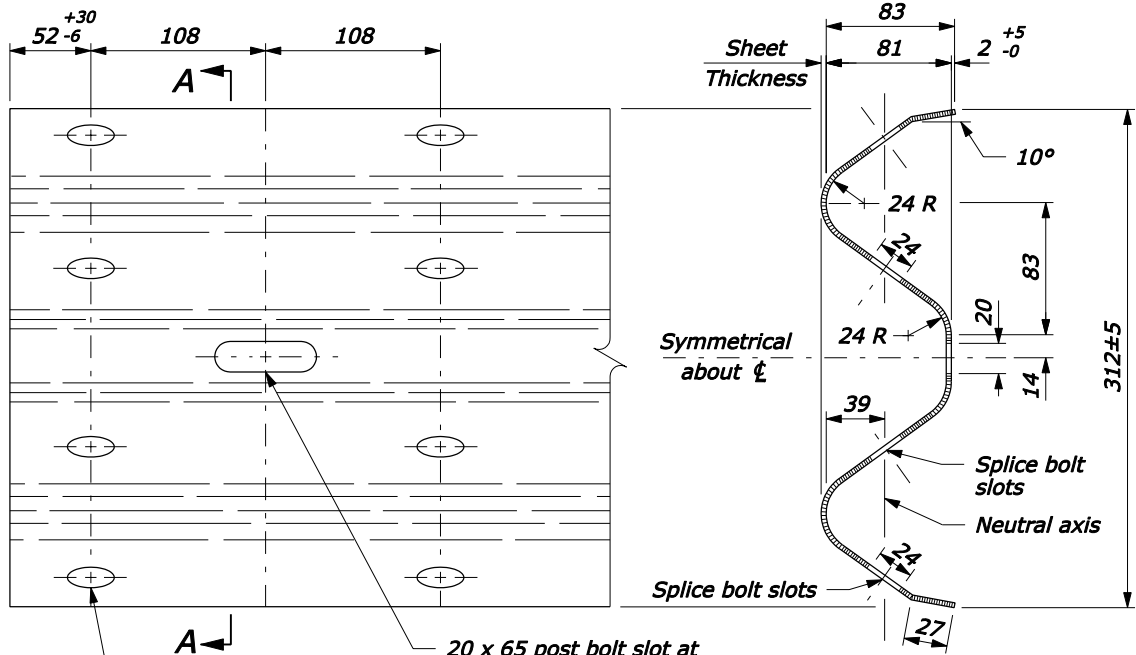
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

G4 W-BEAM GUARDRAIL
STEEL POSTS

STANDARD APPROVED FOR USE 1/1994
REVISED: 4/1994 6/2005

STANDARD
617-11

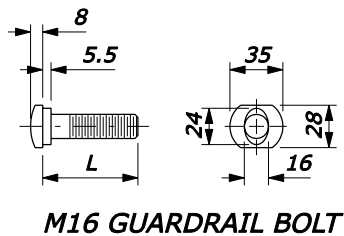


20 x 65 post bolt slot at 1.905 m spacing, center to center
24 x 30 splice bolt slot. 8 required, each end rail element

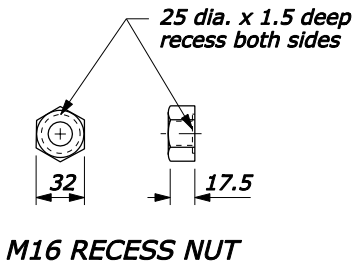
RAIL ELEMENT ELEVATION

SECTION A-A

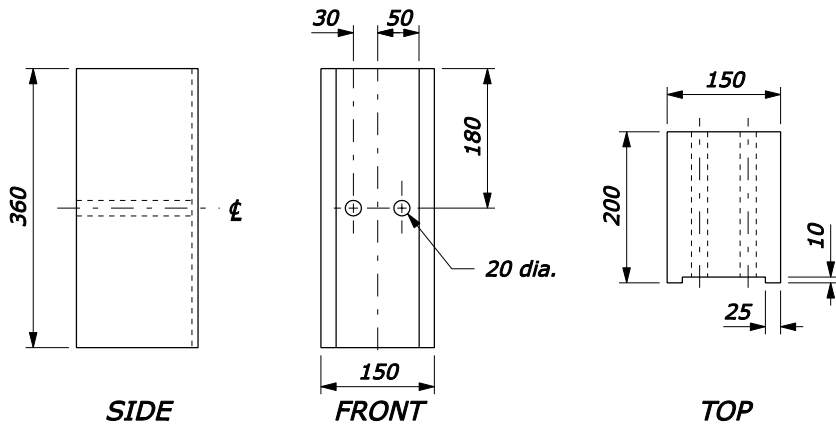
W BEAM RAIL MEMBERS



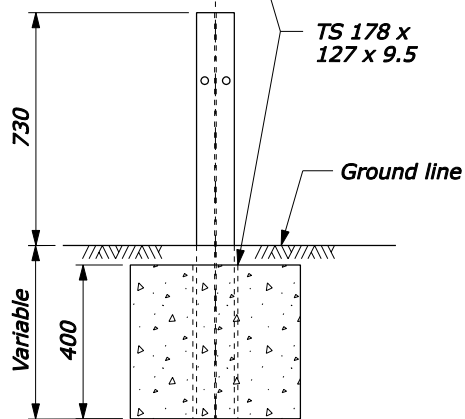
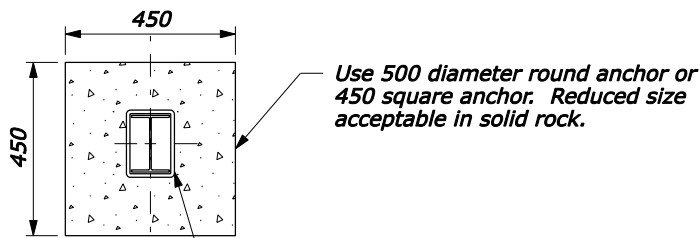
L	Thread Length
35	30 minimum
50	45 minimum
255	100 minimum
460	100 minimum
640	100 minimum



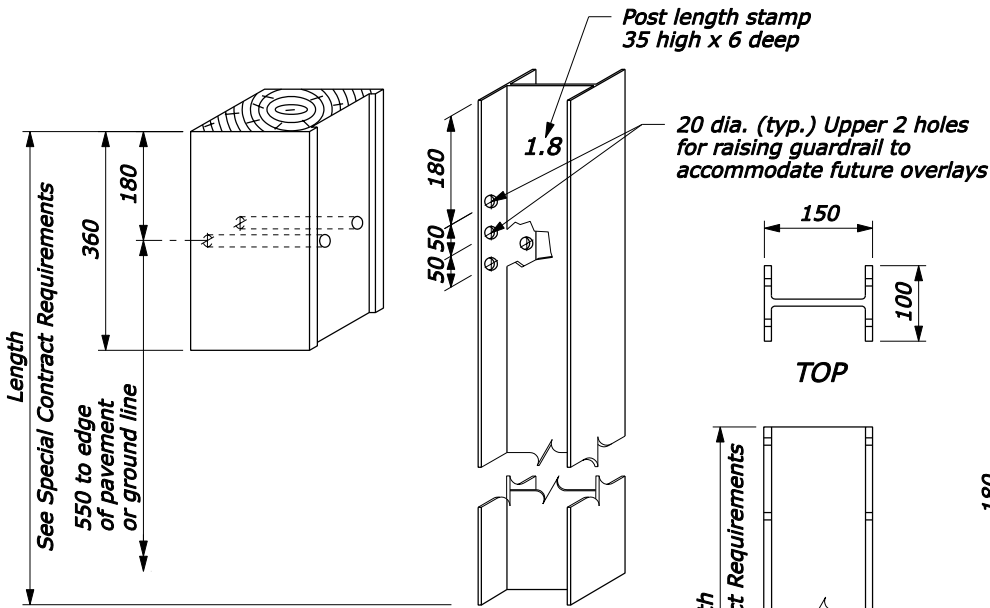
GUARDRAIL BOLT AND RECESS NUT



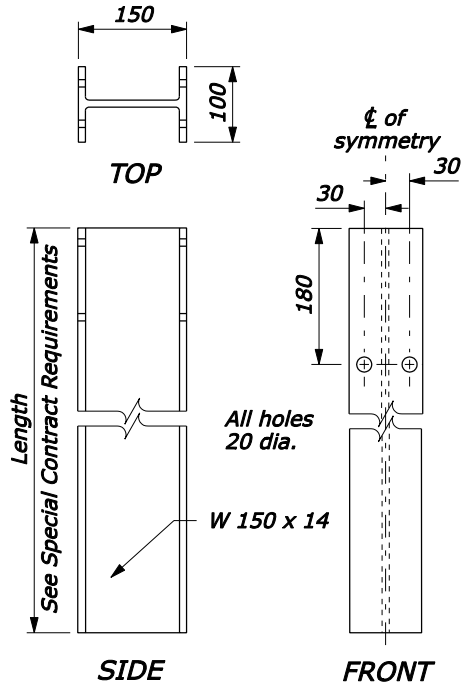
WOOD BLOCK



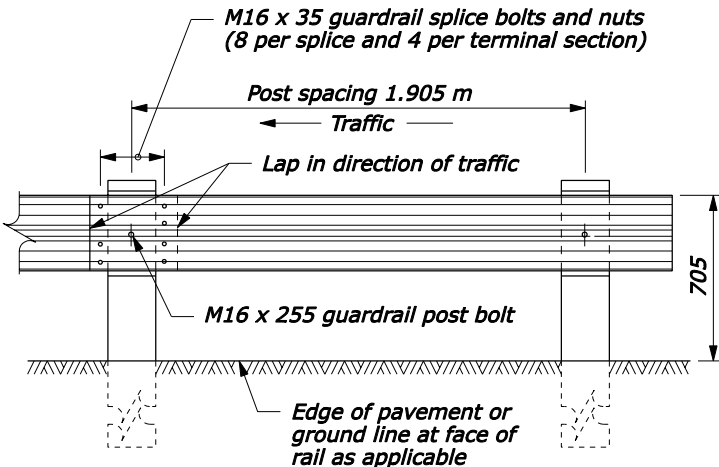
CONCRETE ANCHOR FOR SHORT GUARDRAIL POST
(See Note 1 and 2)



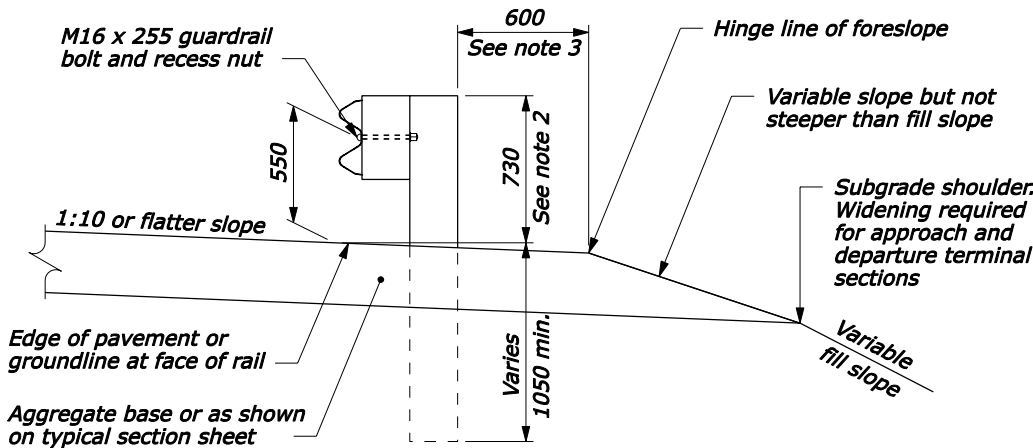
ALTERNATE HOLE ARRANGEMENT POST AND BLOCK DETAIL



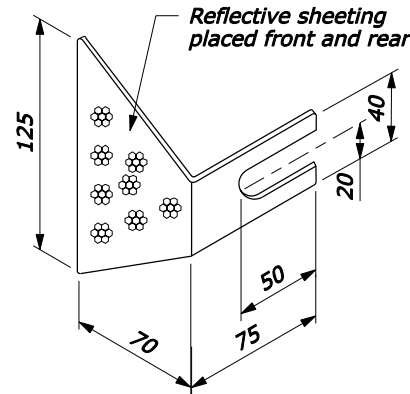
STRUCTURAL SHAPE POST



POST SPACING STANDARD POST SECTION



TYPICAL GUARDRAIL CROSS SECTION

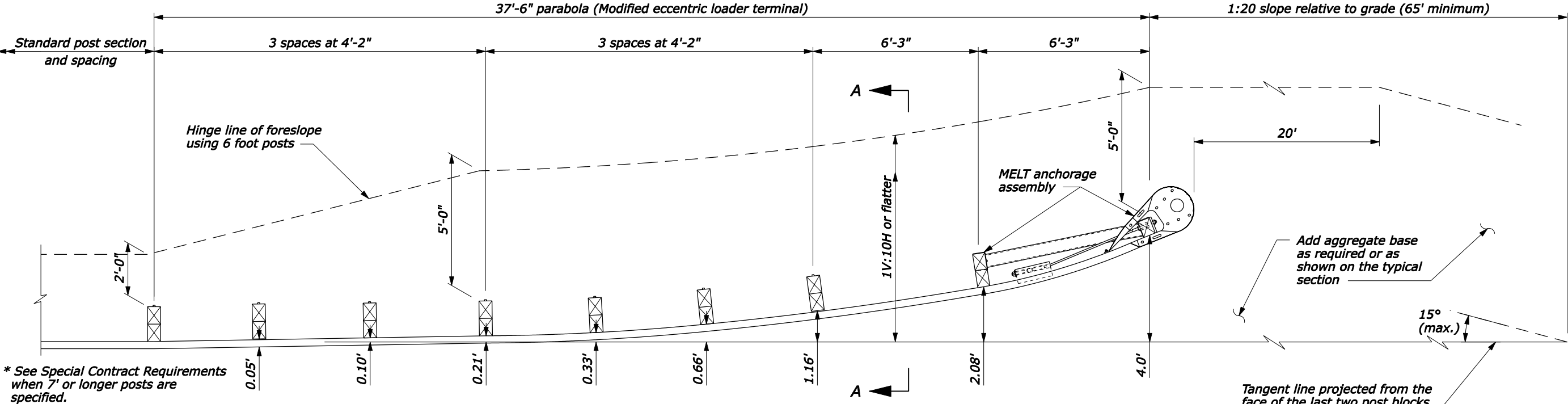


REFLECTOR TAB
(See Note 4)

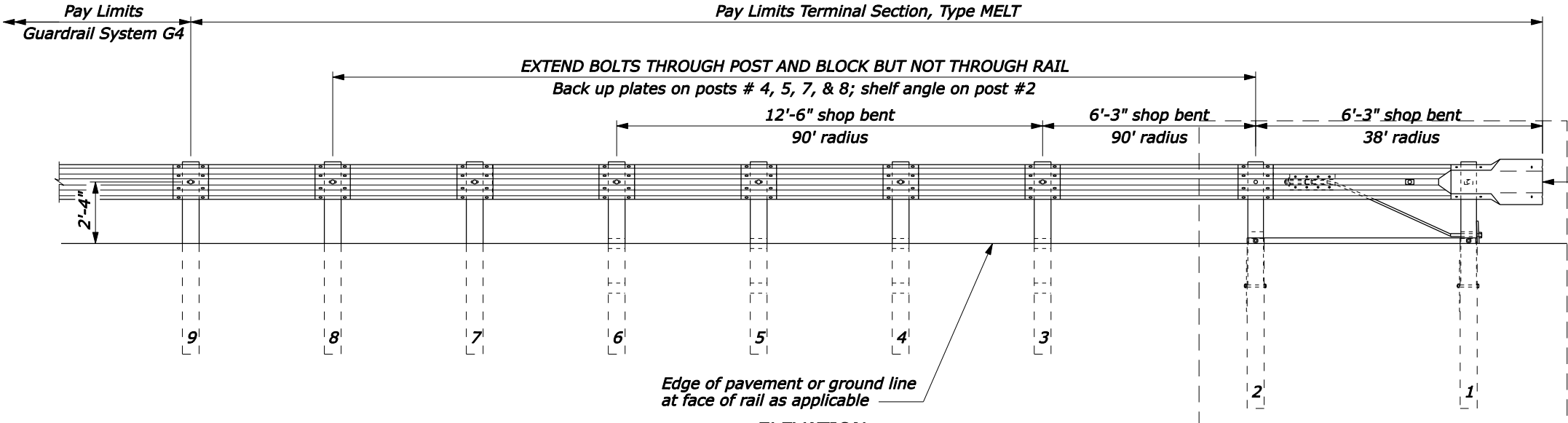
NO SCALE

NOTE:

1. Use no more than 3 short guardrail posts in a row.
2. If directed to use alternate hole arrangement, post above ground shall be 840 mm tall.
3. See Special Contract Requirements when 2.1 m or longer posts are specified.
4. Install reflector tab between post bolt and rail, every fourth post. Alternate reflector tab shapes are acceptable.
5. Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance, and accepted manufacturing practices.
6. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are unavailable.
7. Dimensions without units are millimeters.

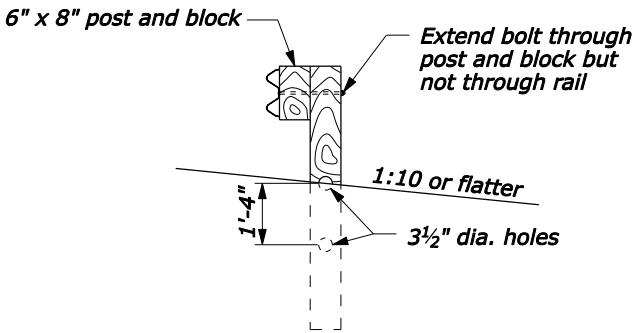


PLAN

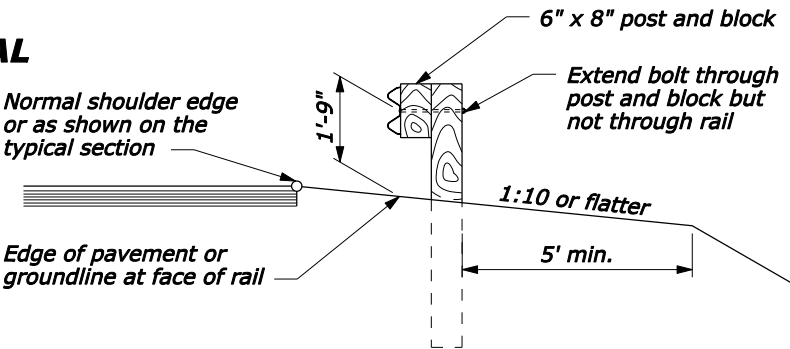


ELEVATION

**APPROACH & DEPARTURE FLARE
WITH MODIFIED ECCENTRIC LOADER TERMINAL**



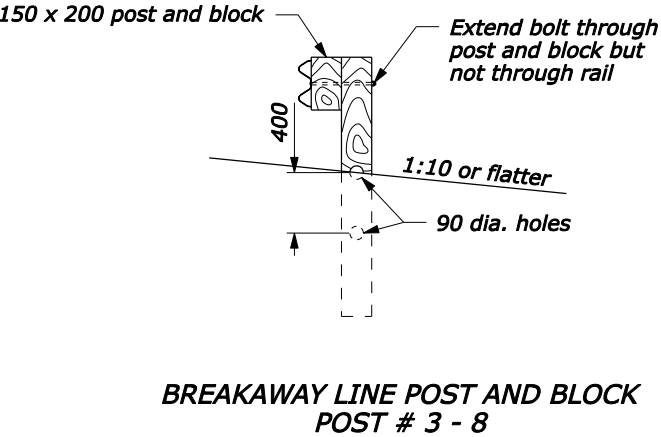
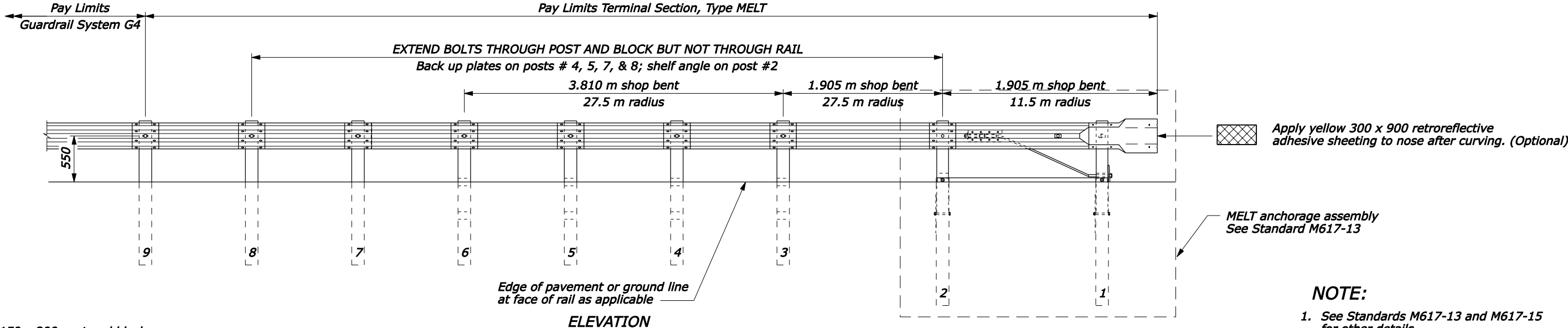
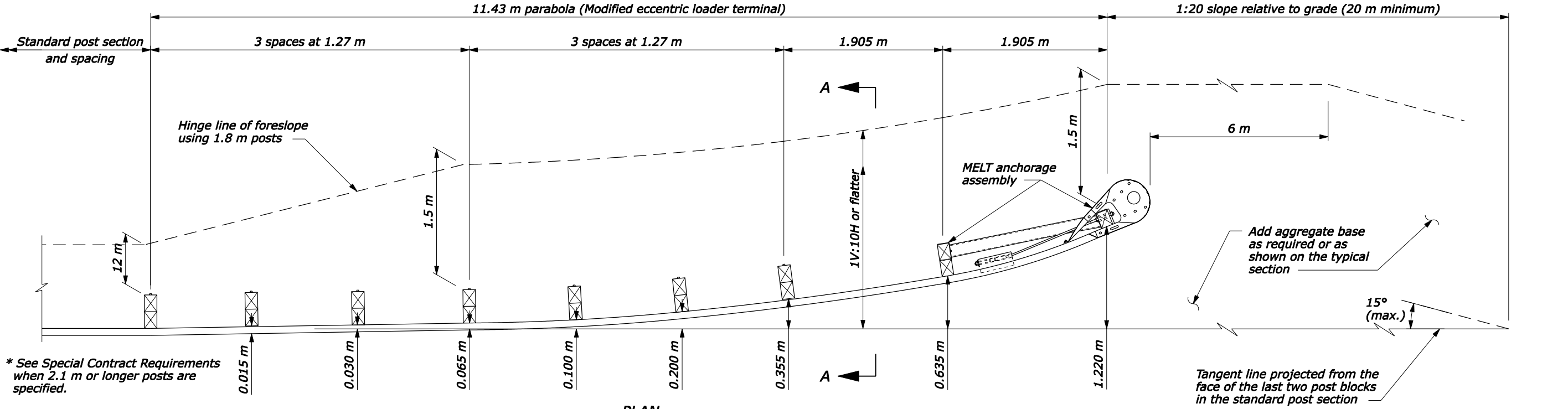
BREAKAWAY LINE POST AND BLOCK
POST # 3 - 8



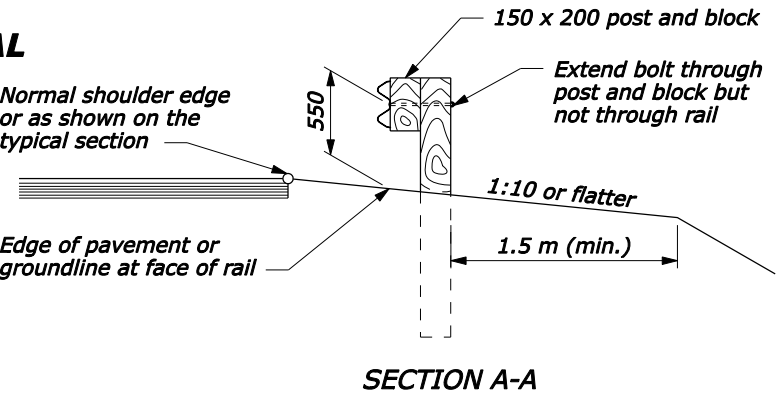
SECTION A-A
NO SCALE

NOTE:
1. See Standards 617-13 and 617-15 for other details.

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD G4 W BEAM GUARDRAIL MODIFIED ECCENTRIC LOADER TERMINAL TYPE MELT	
STANDARD APPROVED FOR USE 1/1994 REVISED: 4/1994 6/2005	STANDARD 617-12



**APPROACH & DEPARTURE FLARE
WITH MODIFIED ECCENTRIC LOADER TERMINAL**



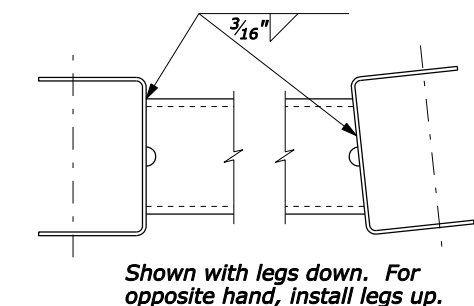
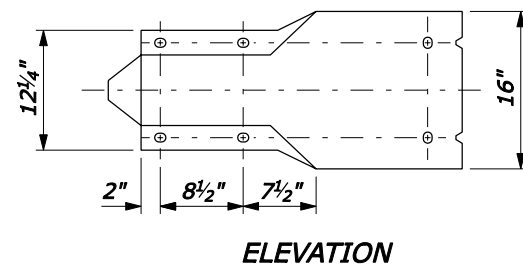
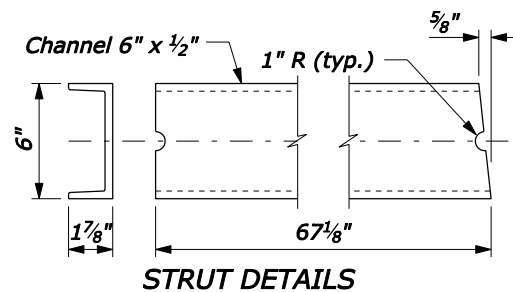
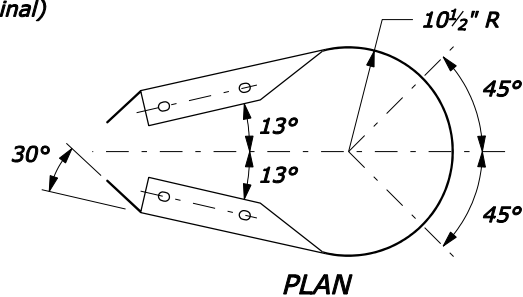
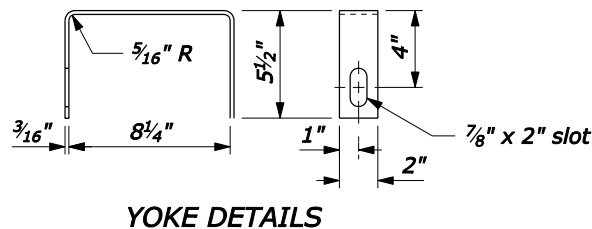
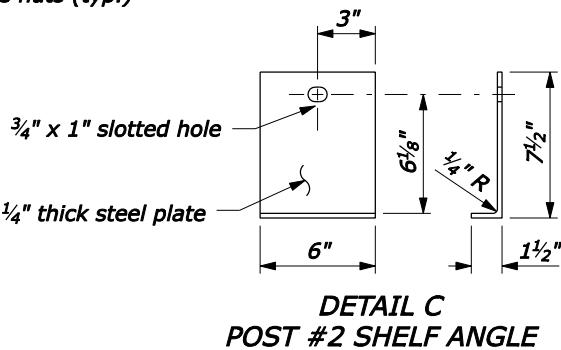
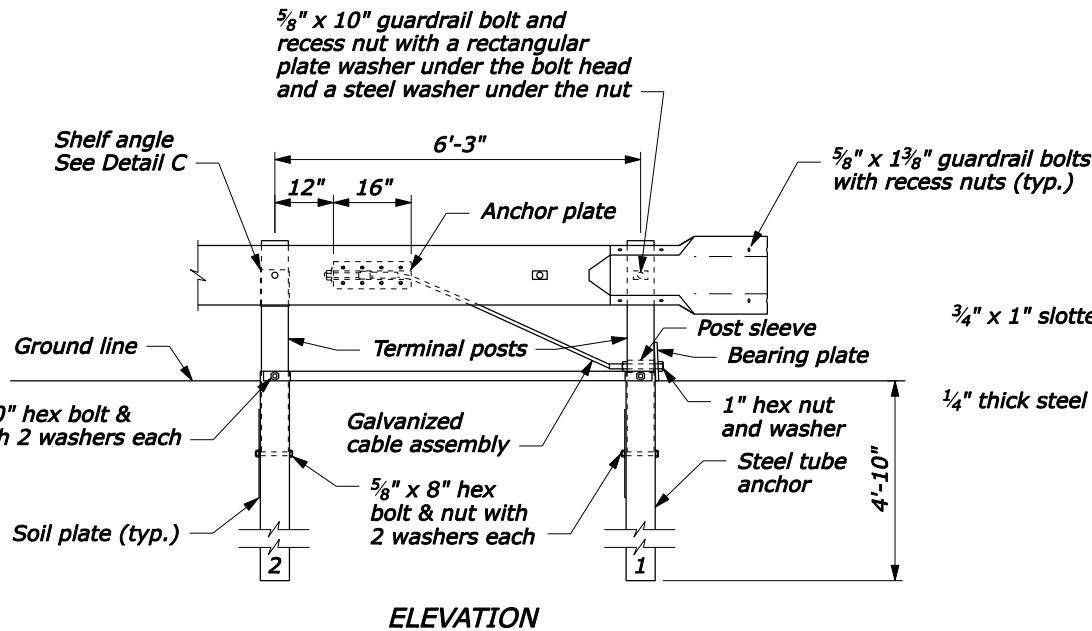
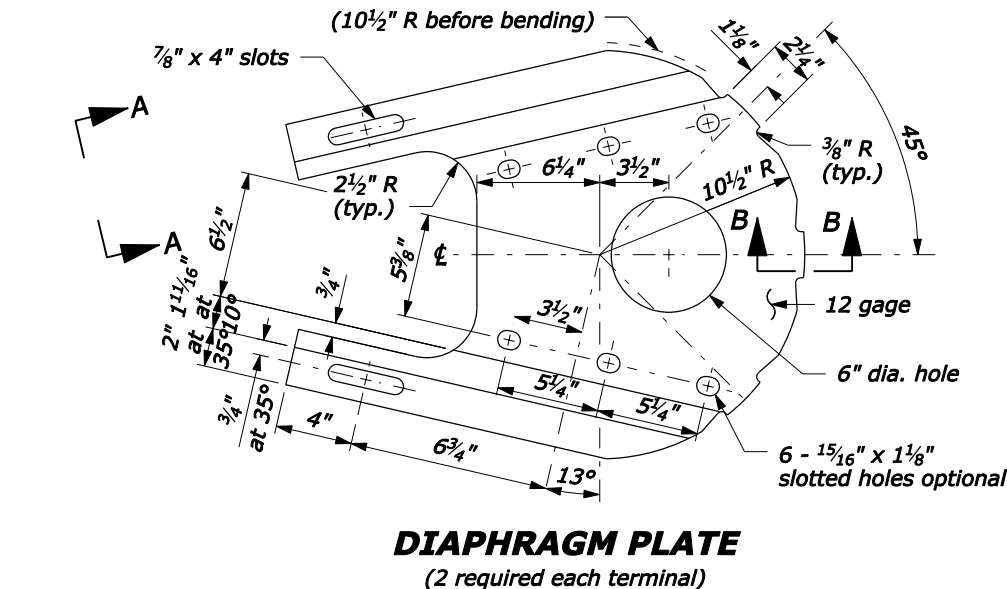
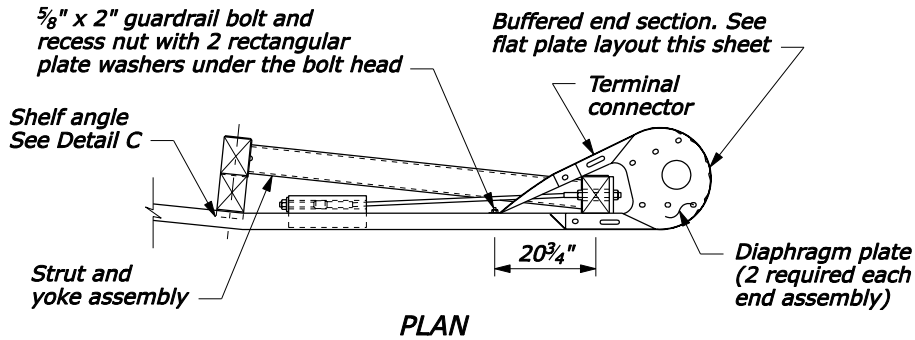
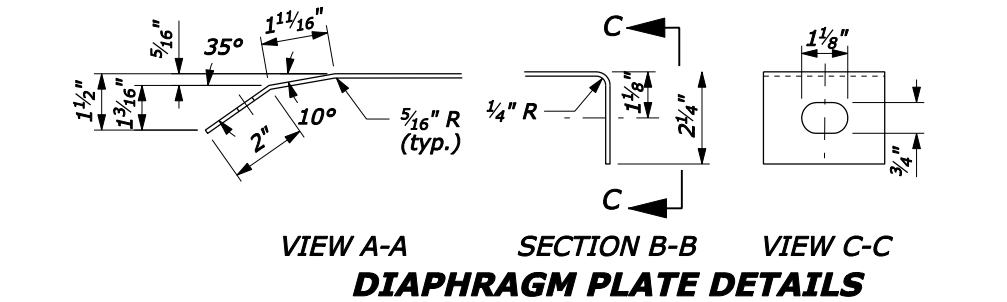
- NOTE:**
1. See Standards M617-13 and M617-15 for other details.
 2. Dimension without units are millimeters.

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
METRIC STANDARD G4 W BEAM GUARDRAIL MODIFIED ECCENTRIC LOADER TERMINAL TYPE MELT	
STANDARD APPROVED FOR USE 3/1996 REVISED: 12/1998 6/2005	STANDARD M617-12

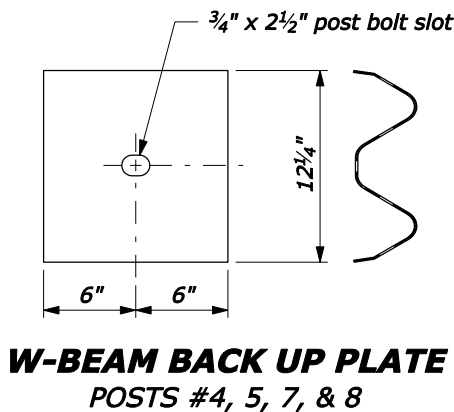
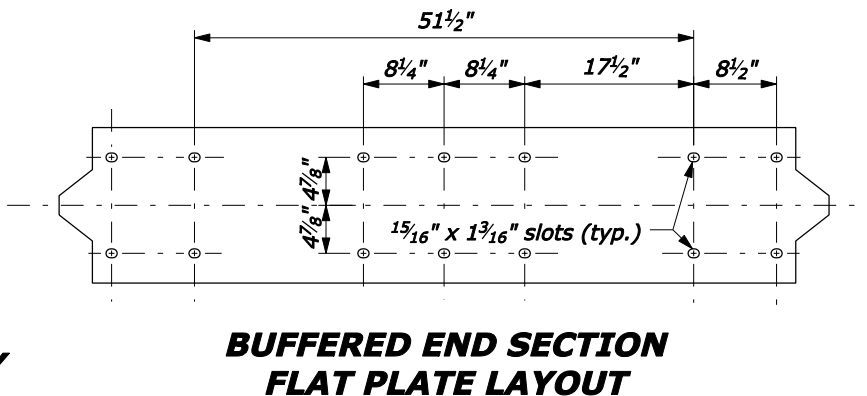
NOTE:

1. See Standard 617-15 for other details.

2. Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance, and accepted manufacturing practices.



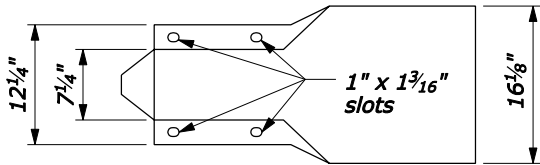
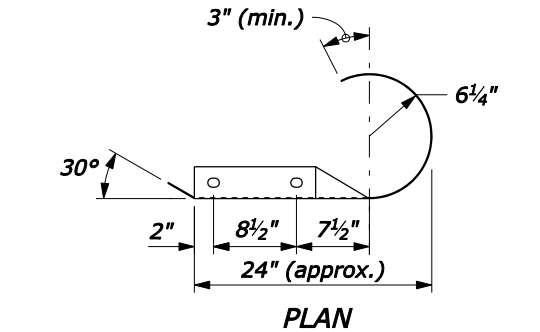
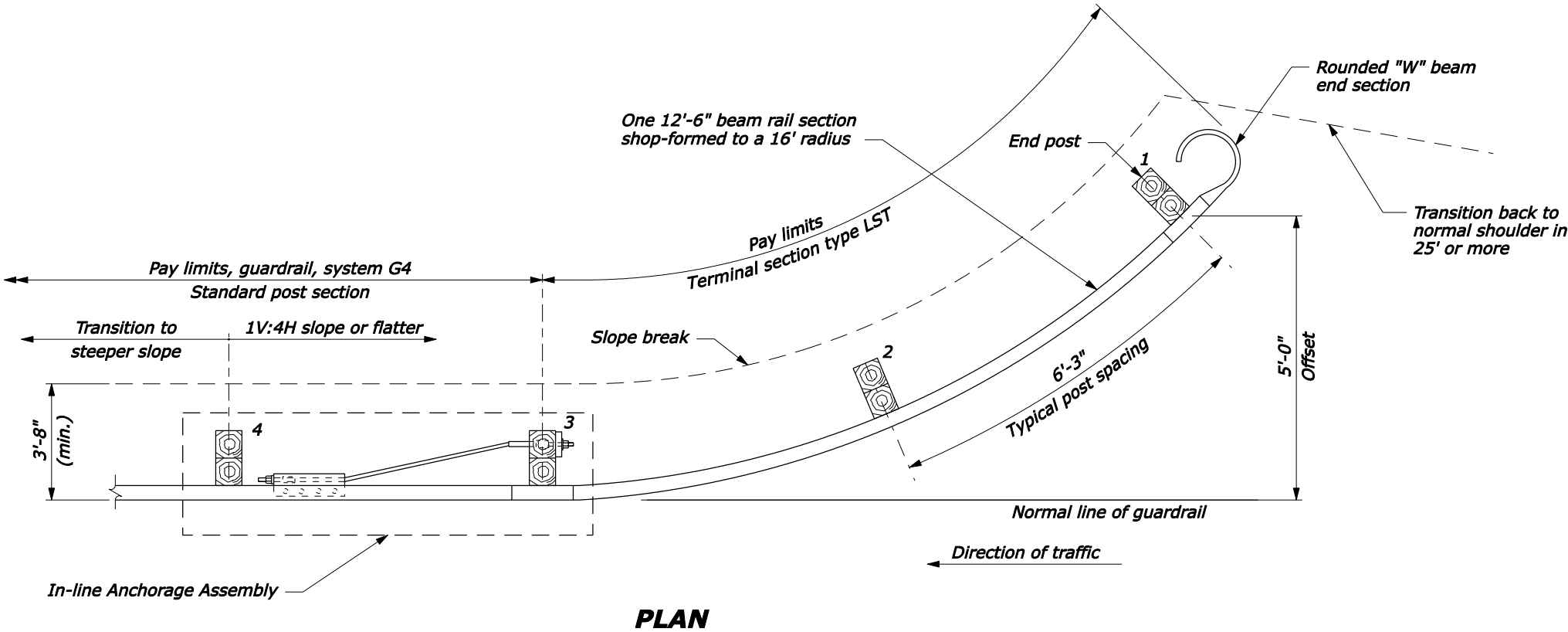
STRUT AND YOKE ASSEMBLY



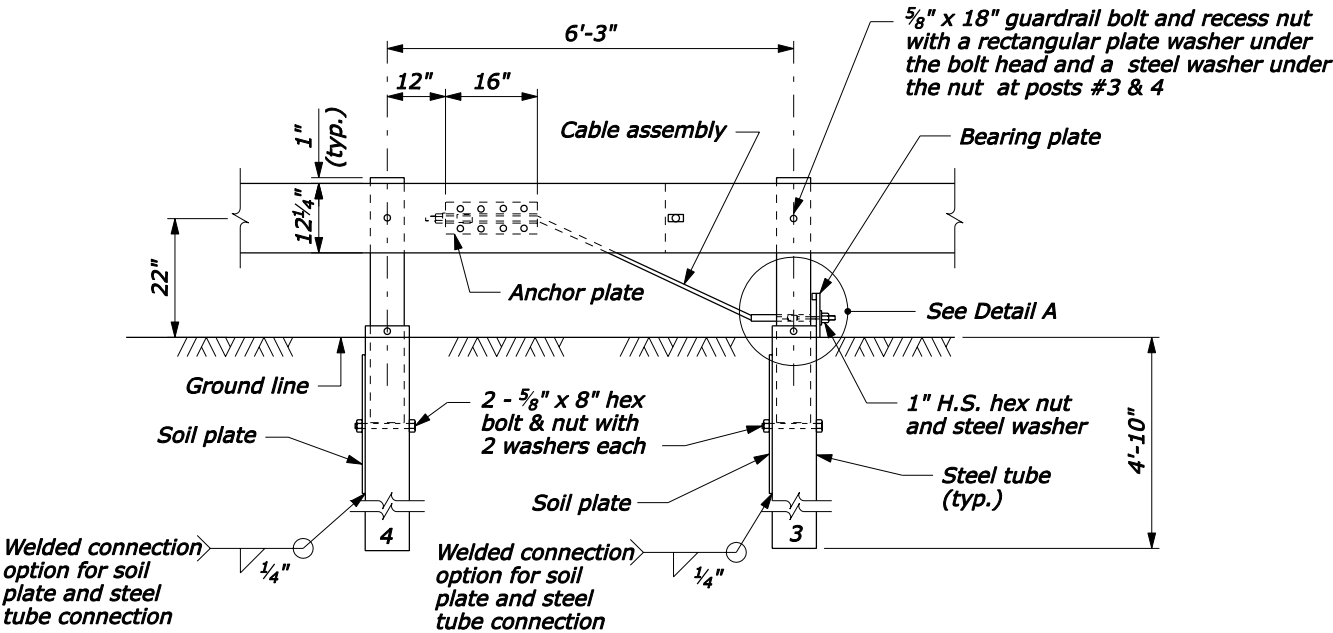
NO SCALE

NOTE:

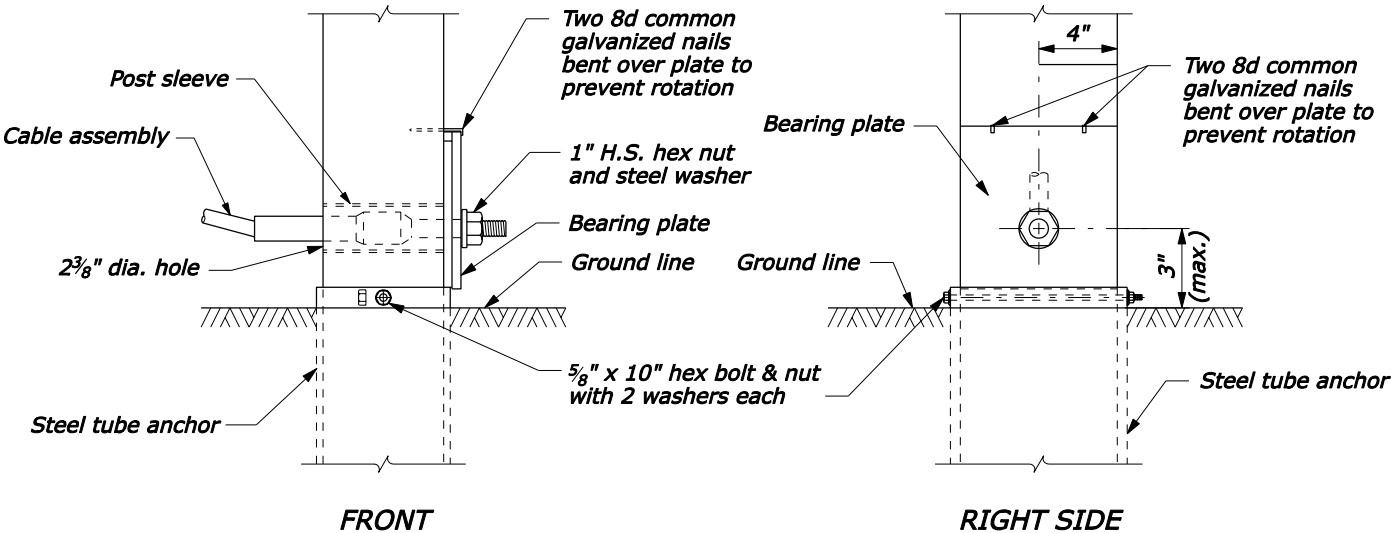
- 1. Pay limits for terminal section type LST include the in-line anchorage assembly at the last two posts of G4 guardrail.
- 2. Use offset from face of rail to slope break as shown unless otherwise shown on plan.
- 3. See Standard M617-15 for other details.



ELEVATION
ROUND END SECTION



IN-LINE ANCHORAGE ASSEMBLY
ELEVATION



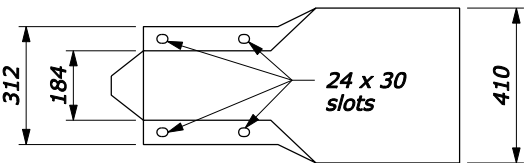
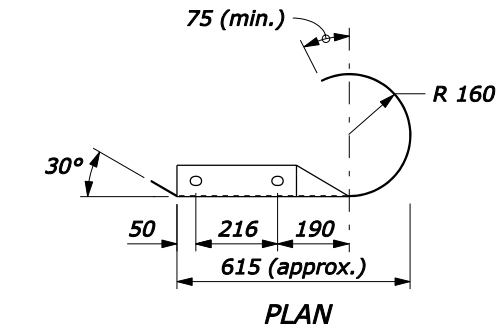
DETAIL A

NO SCALE

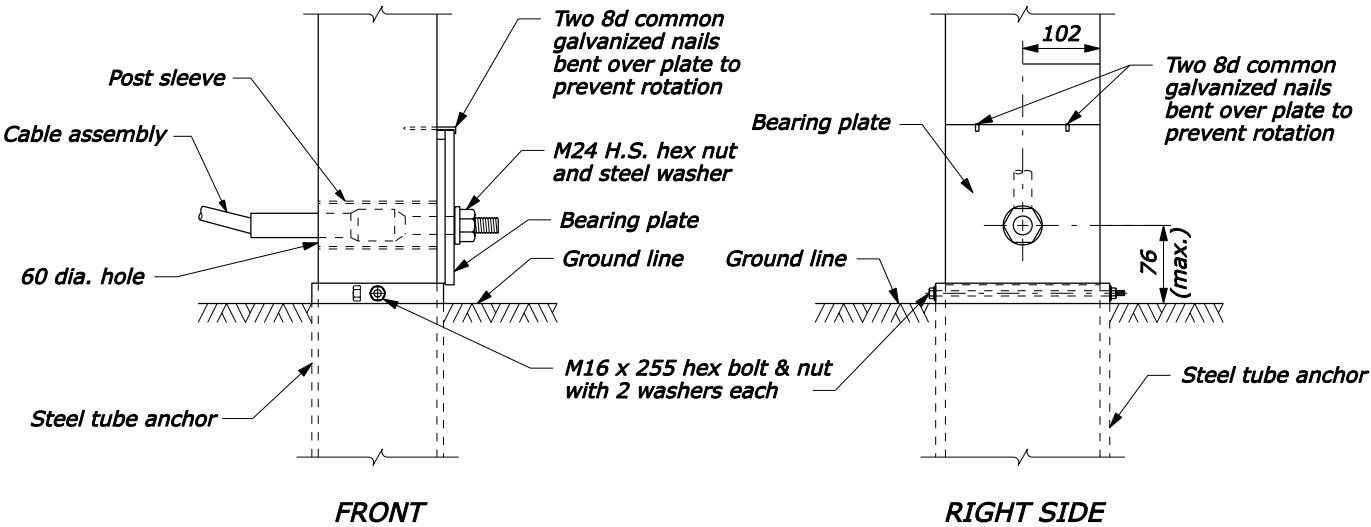
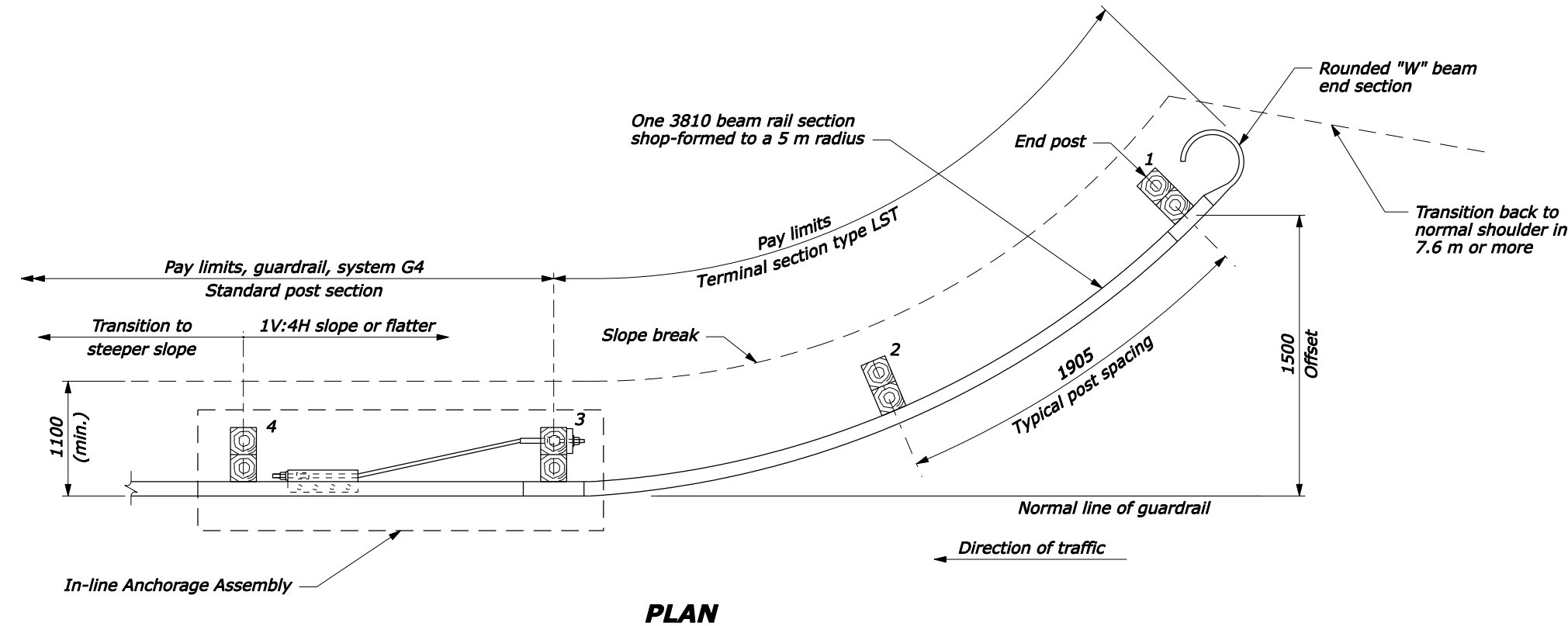
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD G4-W BEAM GUARDRAIL LOW SPEED TERMINAL TYPE LST, WOOD POSTS	
STANDARD APPROVED FOR USE 6/2005 REVISED:	STANDARD 617-14

NOTE:

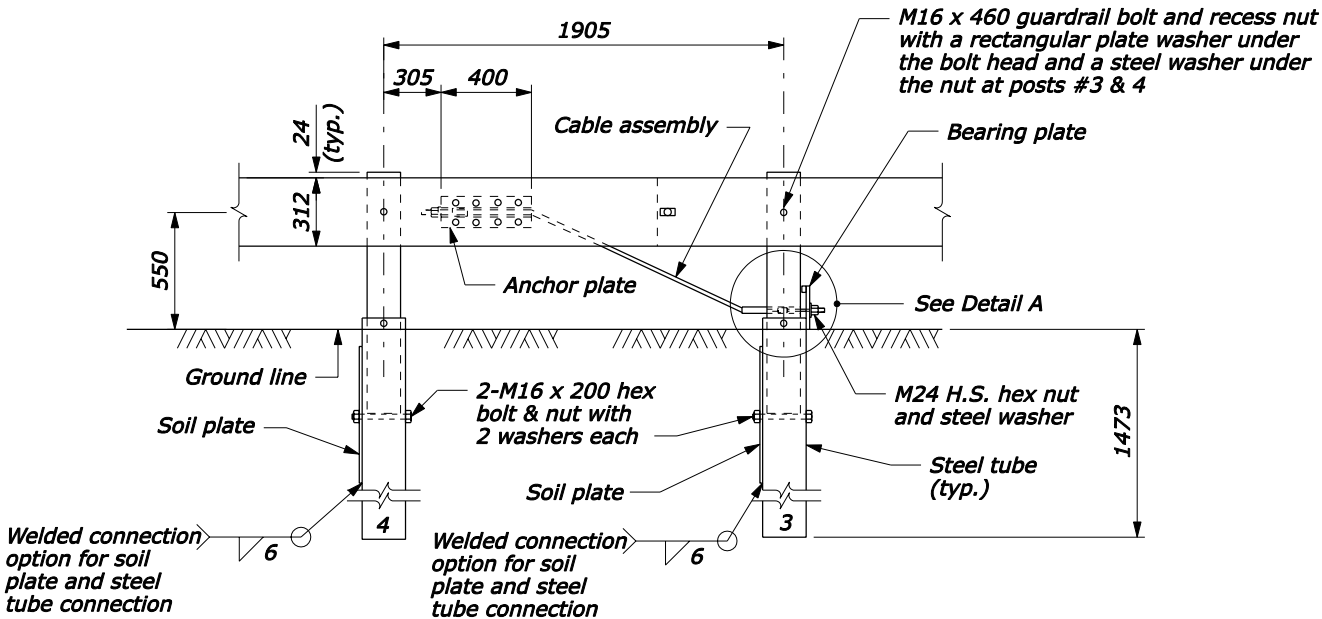
1. Pay limits for terminal section type LST include the in-line anchorage assembly at the last two posts of G4 guardrail.
2. Use offset from face of rail to slope break as shown unless otherwise shown on plan.
3. See Standard M617-15 for other details.
4. Dimensions without units are millimeters.



ELEVATION
ROUND END SECTION

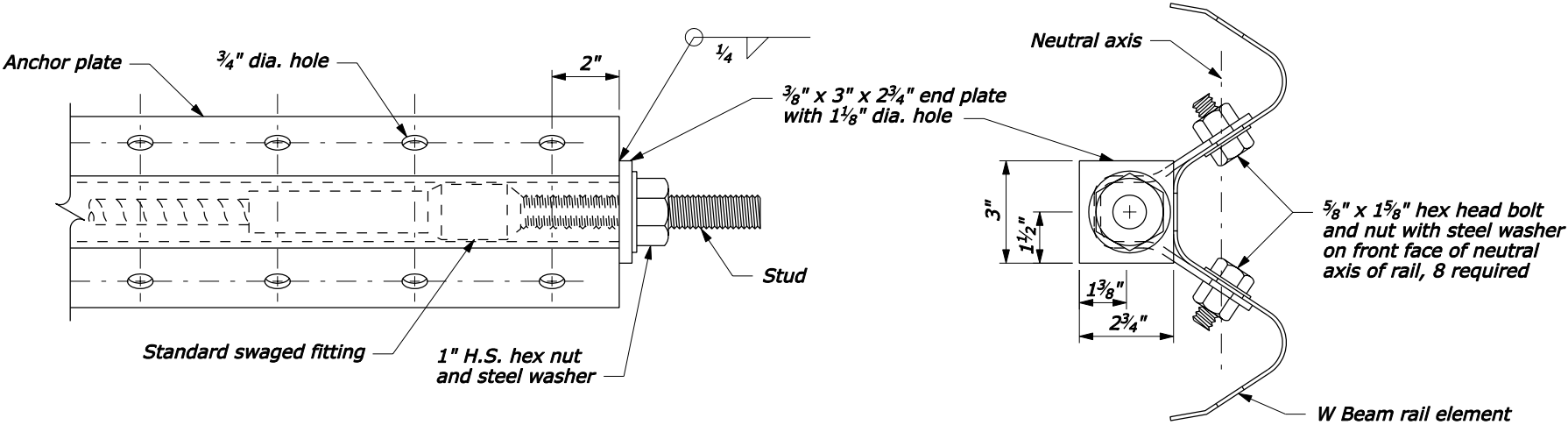


DETAIL A

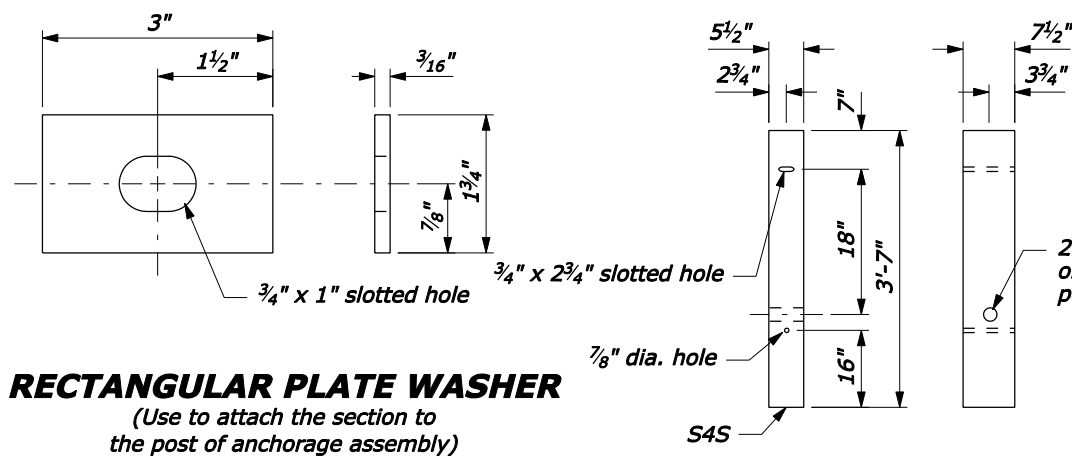


NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
METRIC STANDARD	
G4 W-BEAM GUARDRAIL LOW SPEED TERMINAL TYPE LST, WOOD POSTS	
STANDARD APPROVED FOR USE 6/2005	STANDARD
REVISED:	M617-14

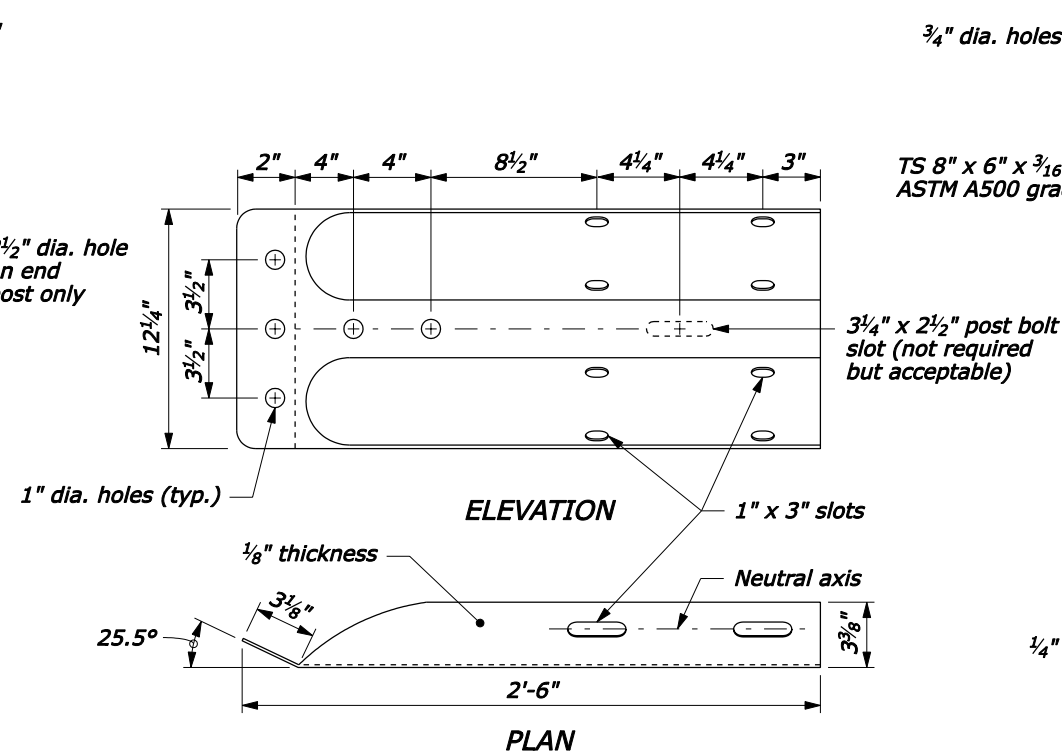


ANCHOR PLATE DETAILS FOR LST ANCHORAGE ASSEMBLY

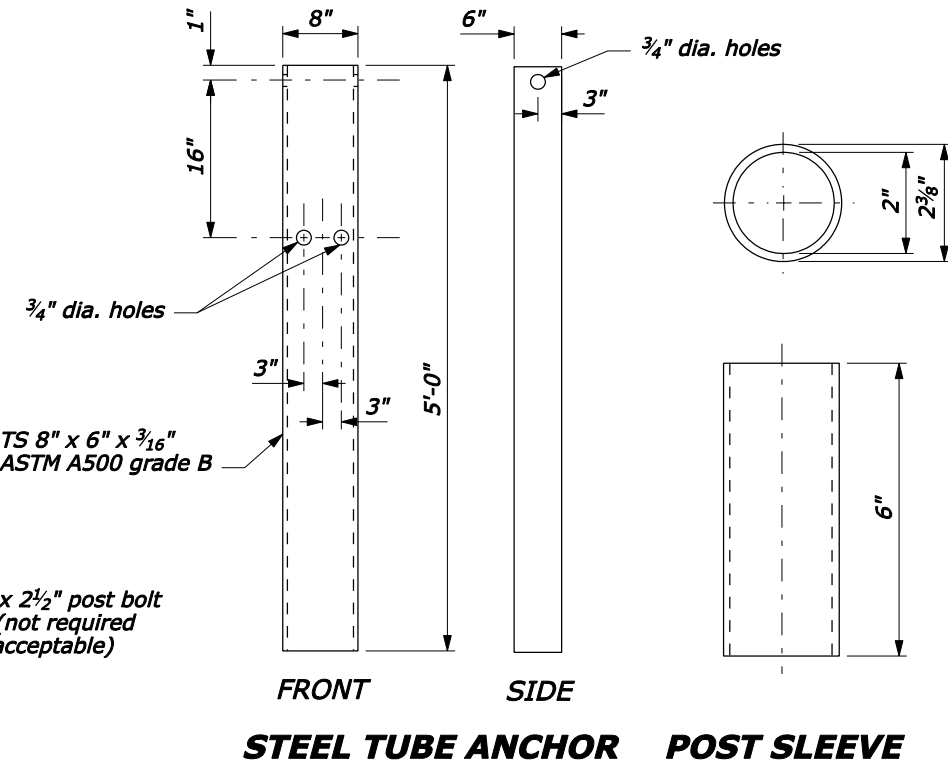


RECTANGULAR PLATE WASHER
(Use to attach the section to the post of anchorage assembly)

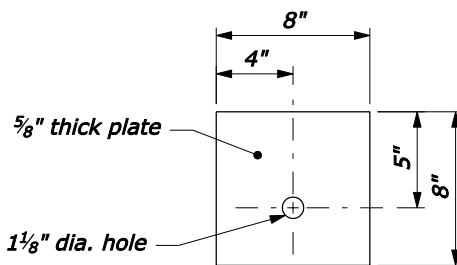
TERMINAL POST



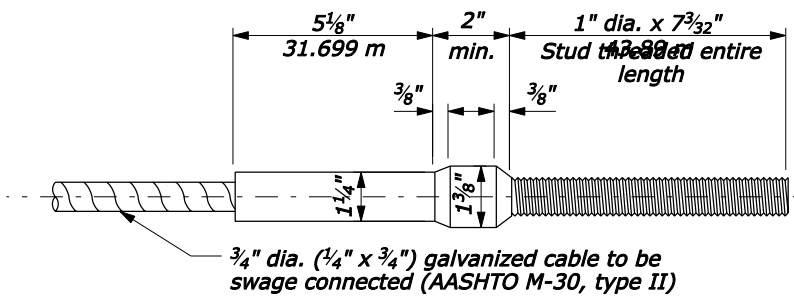
TERMINAL CONNECTOR



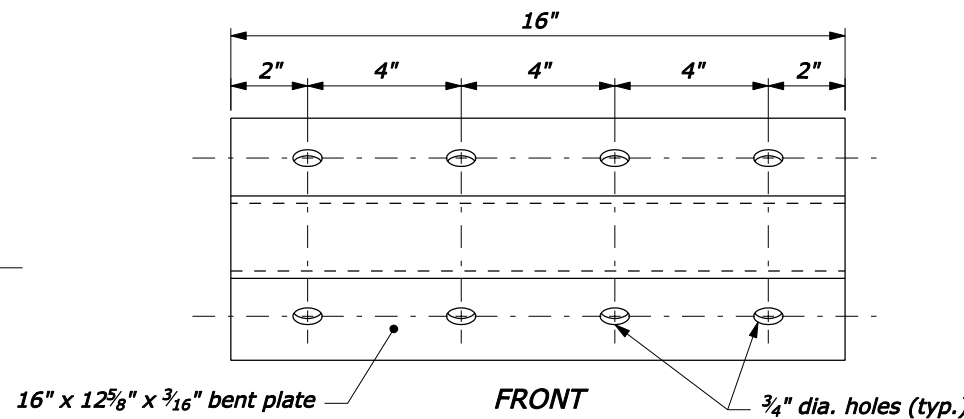
STEEL TUBE ANCHOR POST SLEEVE



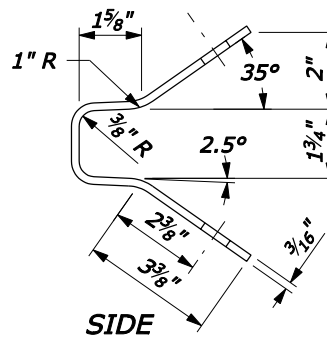
BEARING PLATE



CABLE ASSEMBLY
(Standard swaged fitting and stud)

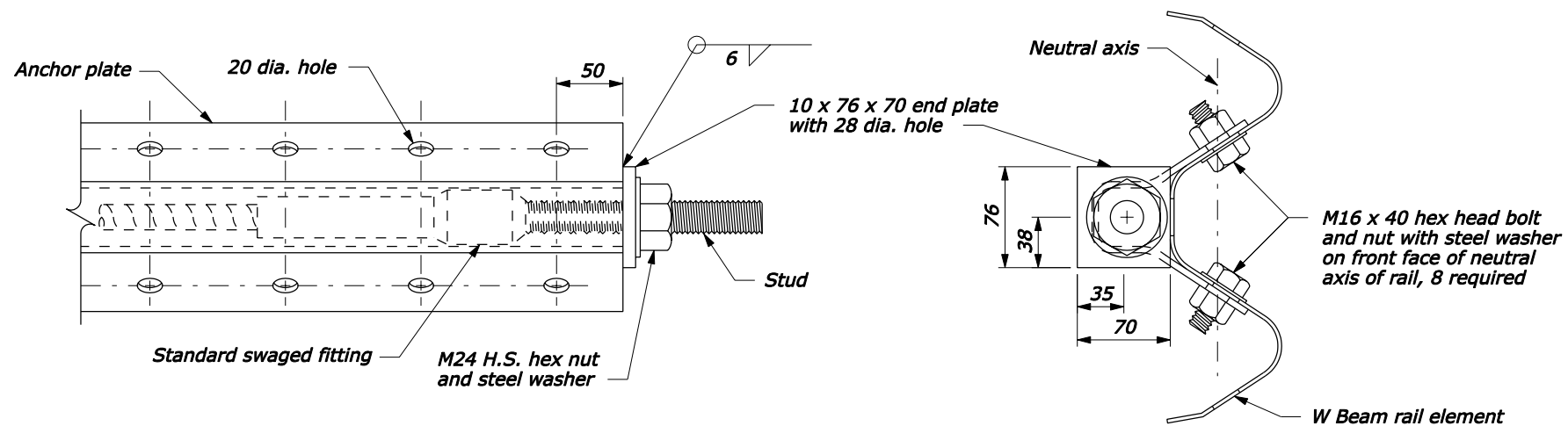


GUARDRAIL ANCHOR PLATE

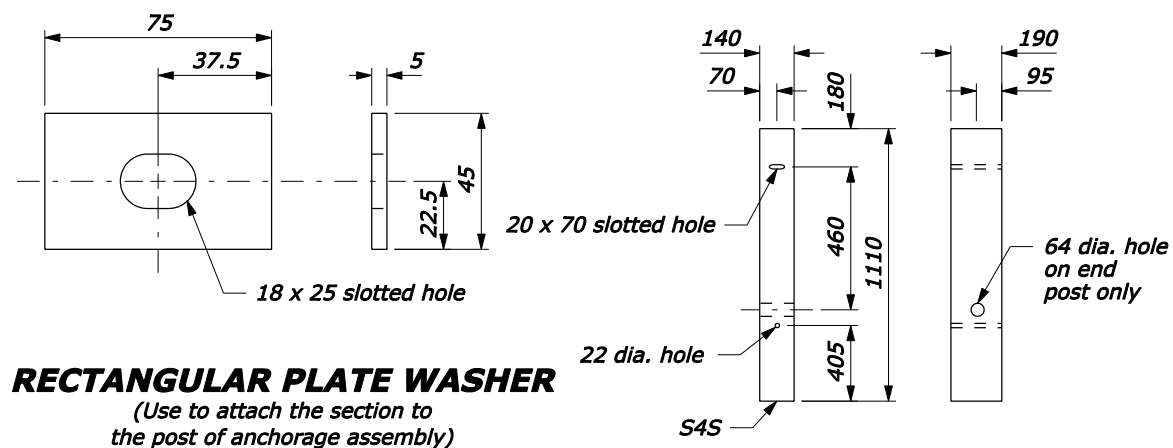


SOIL PLATE
(2 REQUIRED)

NO SCALE



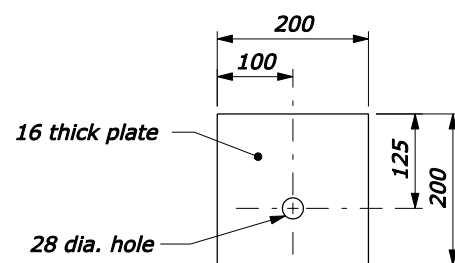
ANCHOR PLATE DETAILS FOR LST ANCHORAGE ASSEMBLY



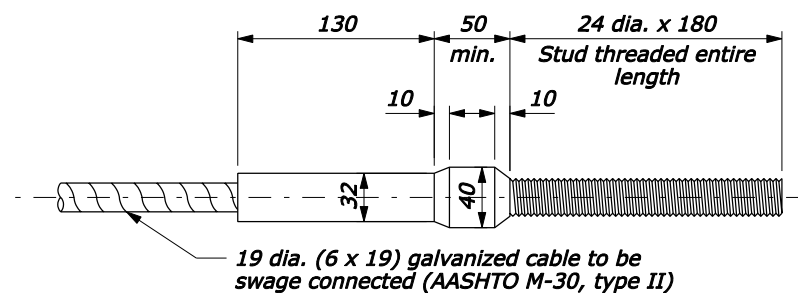
RECTANGULAR PLATE WASHER

(Use to attach the section to the post of anchorage assembly)

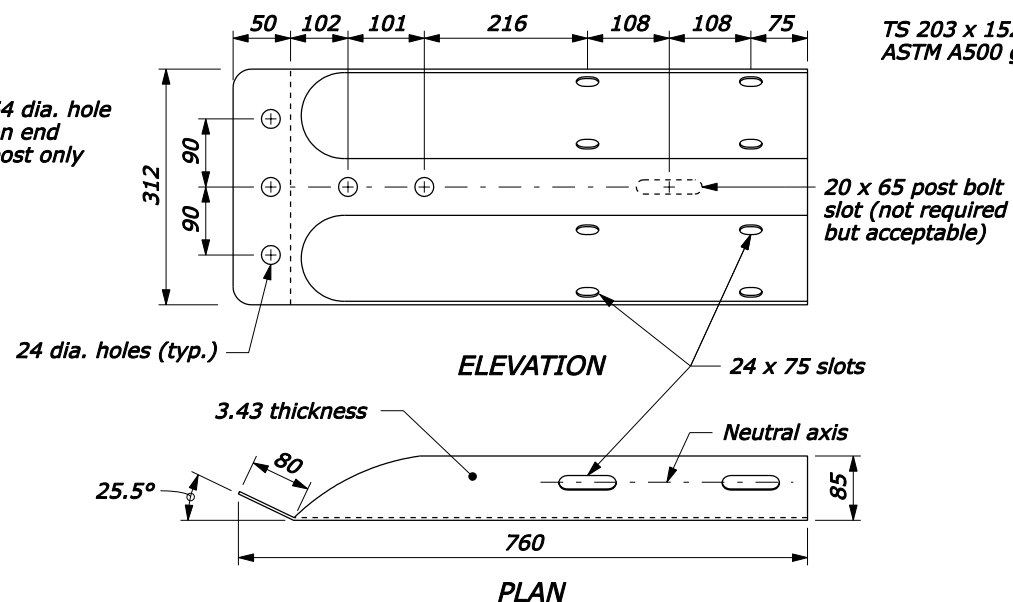
TERMINAL POST



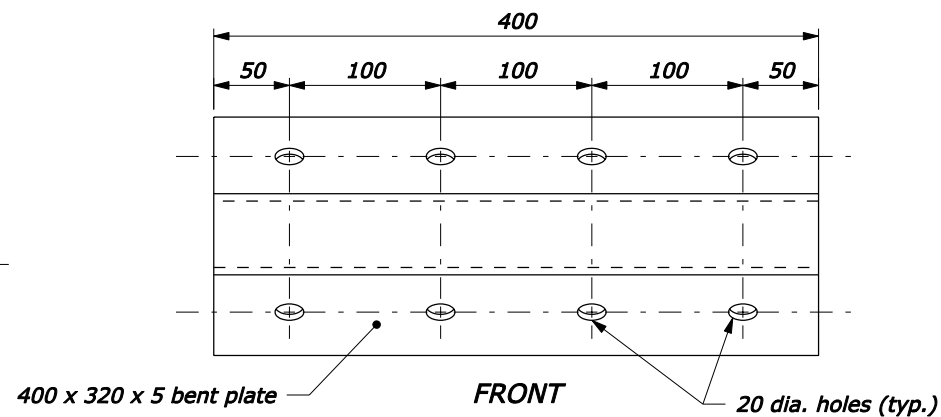
BEARING PLATE



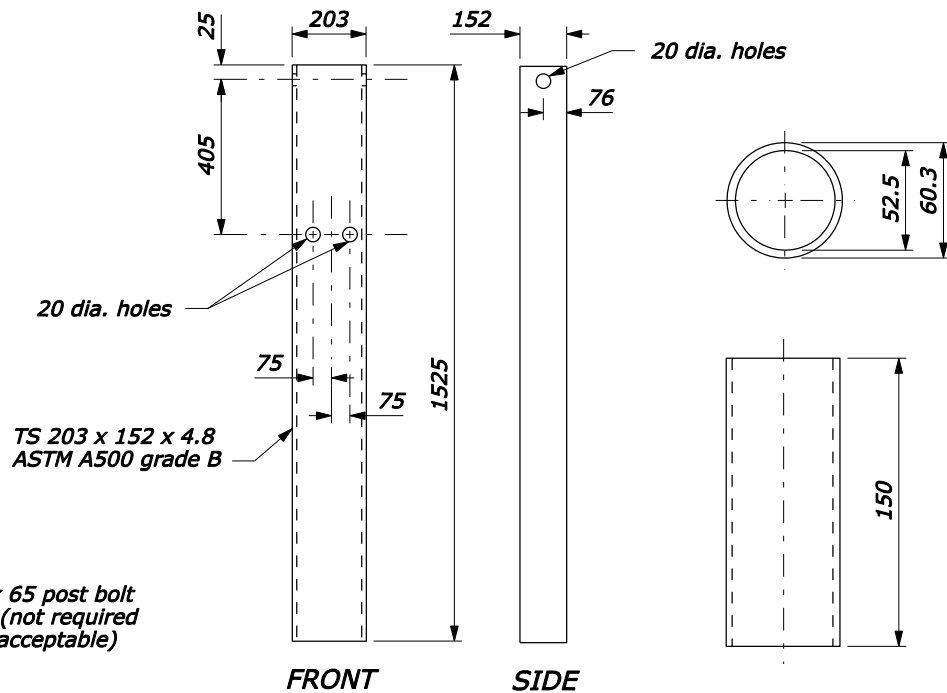
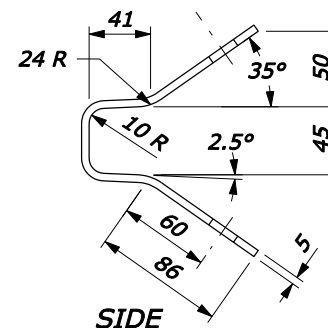
CABLE ASSEMBLY
(Standard swaged fitting and stud)



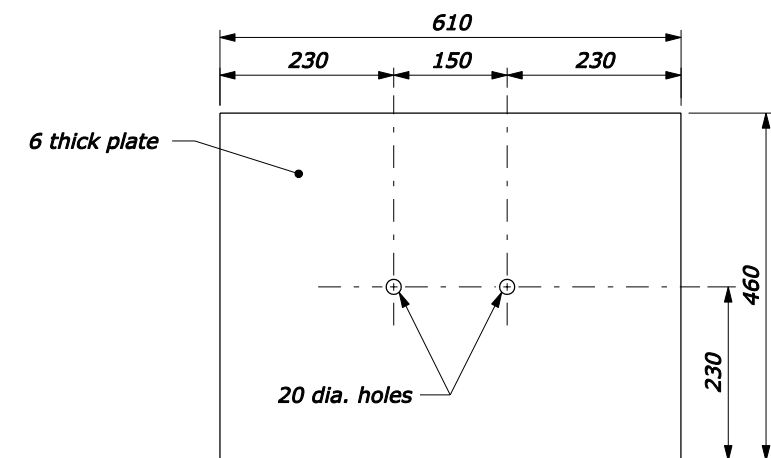
TERMINAL CONNECTOR



GUARDRAIL ANCHOR PLATE



STEEL TUBE ANCHOR POST SLEEVE



SOIL PLATE
(2 REQUIRED)

NOTE:

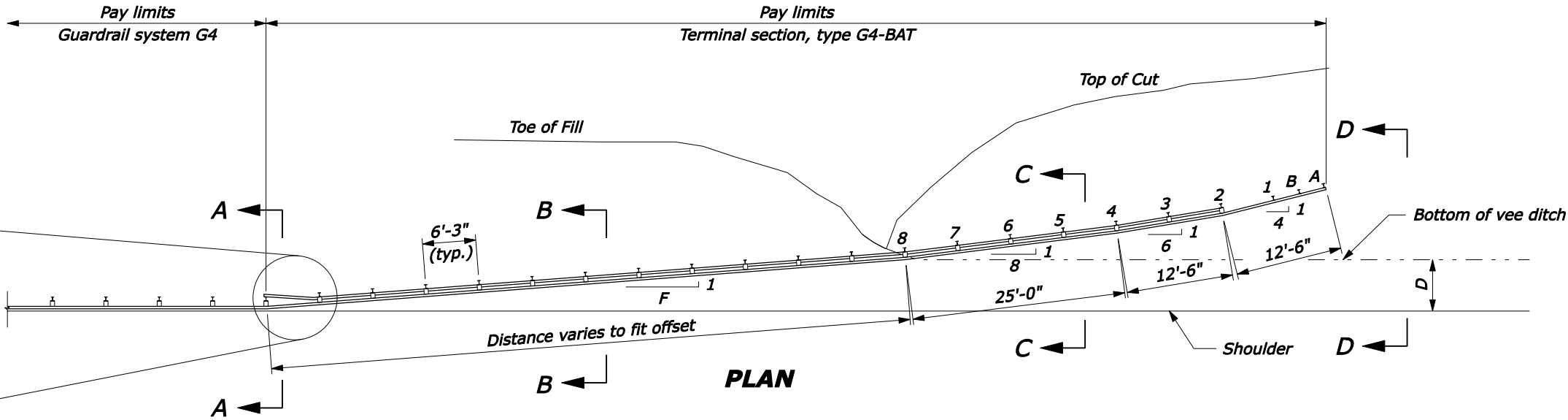
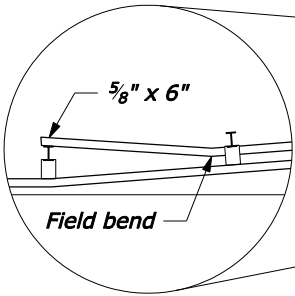
1. Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance, and accepted manufacturing practices.
2. Furnish hardware in the metric sizes shown. Equivalent U.S. Customary sizes may be used when metric sizes are not available.
3. Dimensions without units are millimeters.

NO SCALE

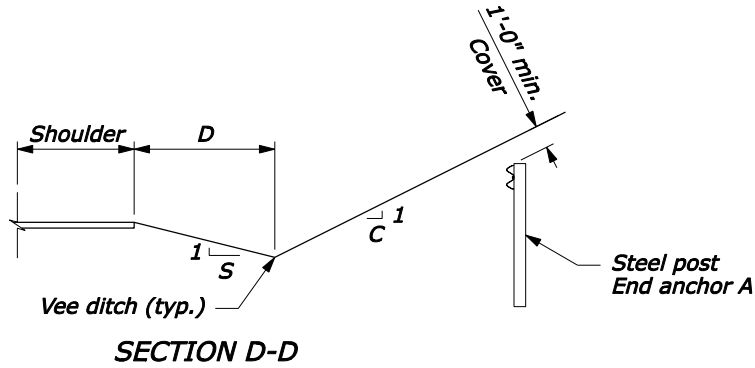
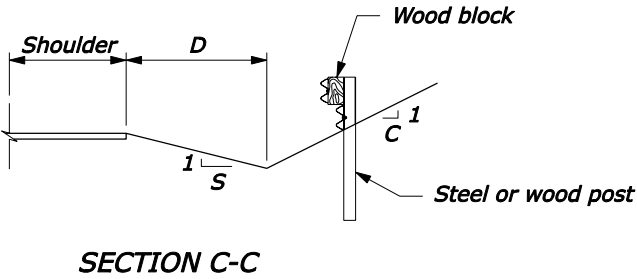
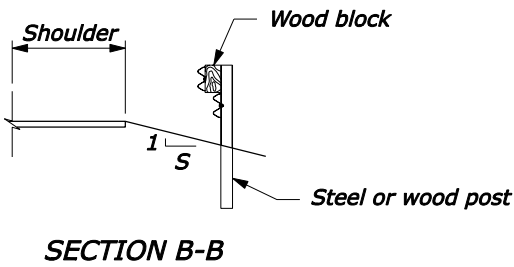
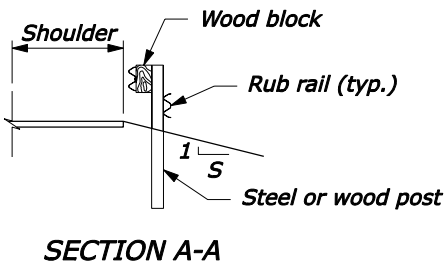
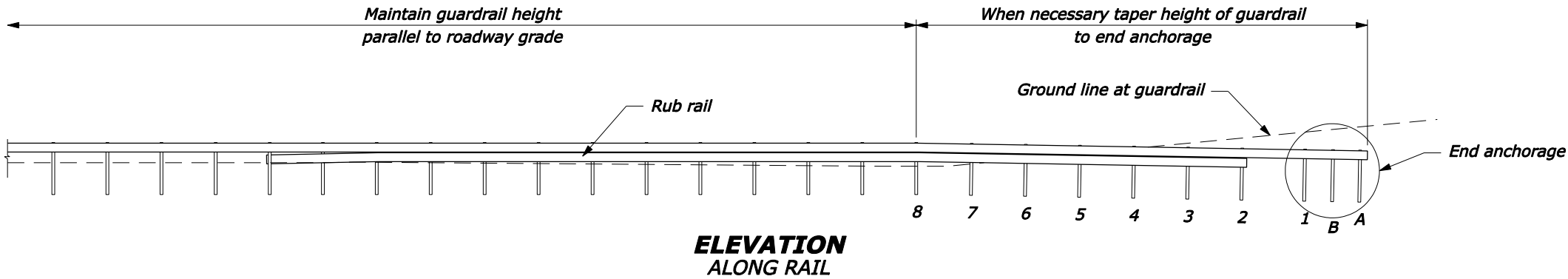
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
METRIC STANDARD	
G4 W BEAM GUARDRAIL MELT, LST & CRT ANCHORAGE ASSEMBLY DETAILS	
STANDARD APPROVED FOR USE 3/1996 REVISED: 8/1997 12/1998 6/2005	STANDARD M617-15

GUARDRAIL FLARE		
DESIGN SPEED MPH	F	
	S = 4	S = 6
70	13	15
60	13	13
55	13	12
50	13	11
45	13	10
35	13	9
≤ 30	13	7

NOTE:
1. See sheet 2 of 2 for post and block details.



POST OFFSETS FROM VEE DITCH	
POST	DISTANCE
A	8'
#2	5'
#4	3'
#8	0



CROSS SECTION DIMENSIONS		
DITCH SLOPE S	DITCH WIDTH D	CUT SLOPE C
4	6'-0"	2
6	8'-10"	4

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

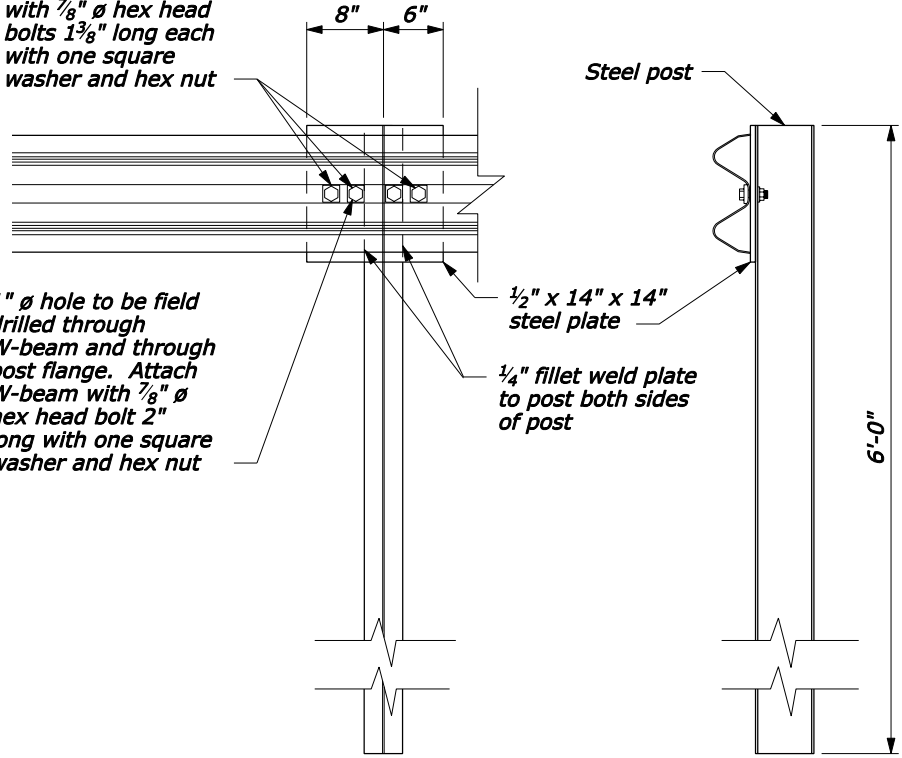
U.S. CUSTOMARY STANDARD
**G4-W BEAM GUARDRAIL
BACK SLOPE ANCHOR TERMINAL
TYPE G4-BAT**
Sheet 1 of 2

STANDARD APPROVED FOR USE 1/1994
REVISED: 4/1994 6/2005

STANDARD
617-17

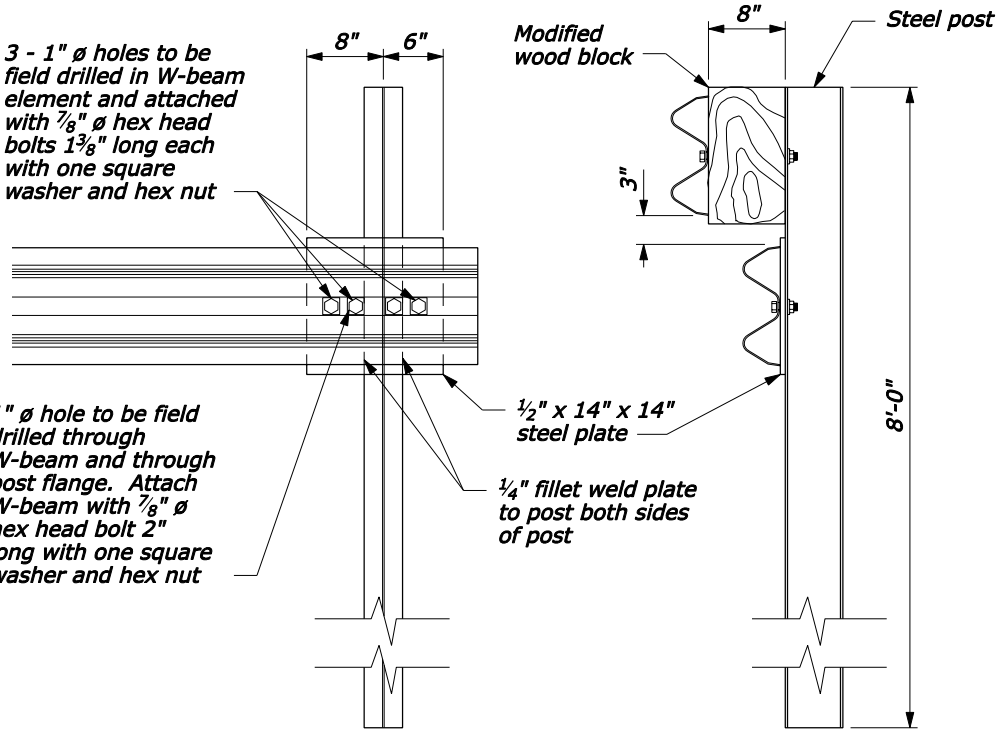
NO SCALE

3 - 1" \varnothing holes to be field drilled in W-beam element and attached with $\frac{7}{8}$ " \varnothing hex head bolts $1\frac{3}{8}$ " long each with one square washer and hex nut

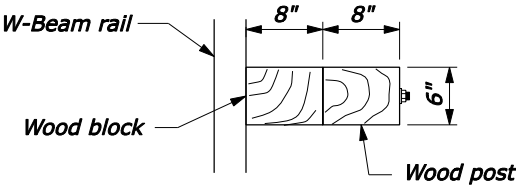


**SPECIAL RAIL TO POST CONNECTION
AT POSTS A, B, AND 1**

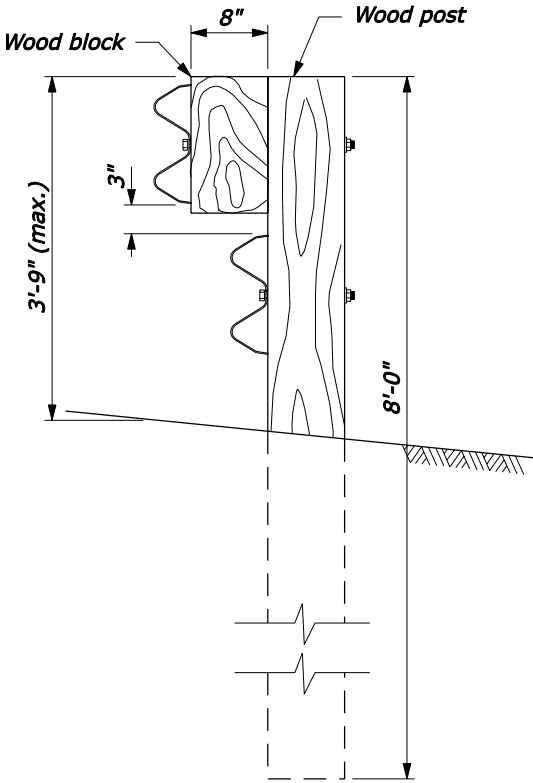
3 - 1" \varnothing holes to be field drilled in W-beam element and attached with $\frac{7}{8}$ " \varnothing hex head bolts $1\frac{3}{8}$ " long each with one square washer and hex nut



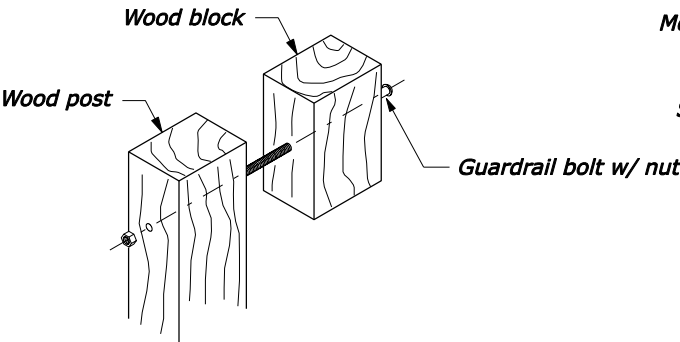
**SPECIAL RUBRAIL TO POST
CONNECTION AT POST 2**



PLAN

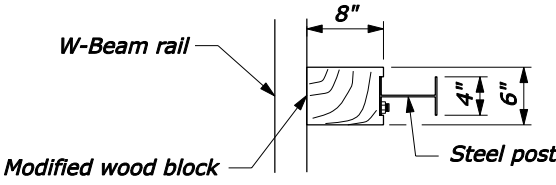


ELEVATION

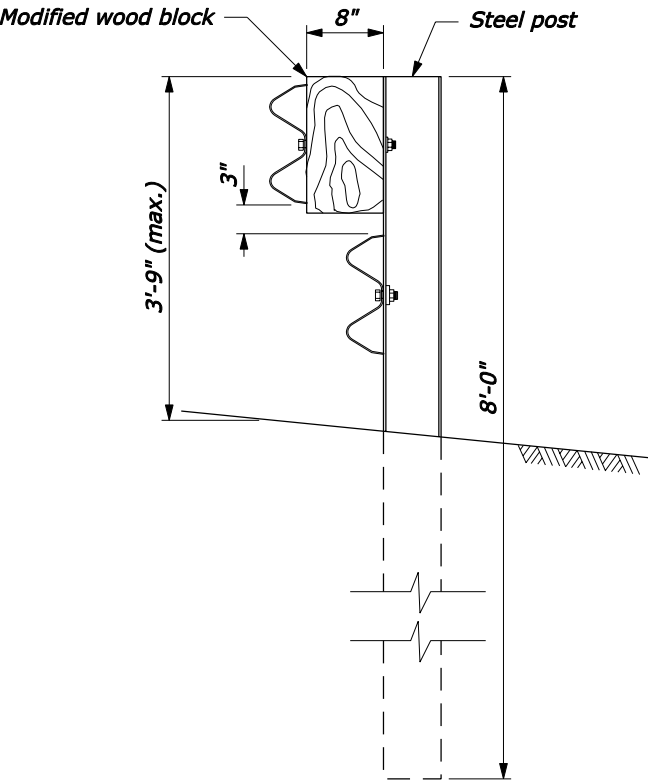


**EXPLODED VIEW
(Rail and washer not shown)**

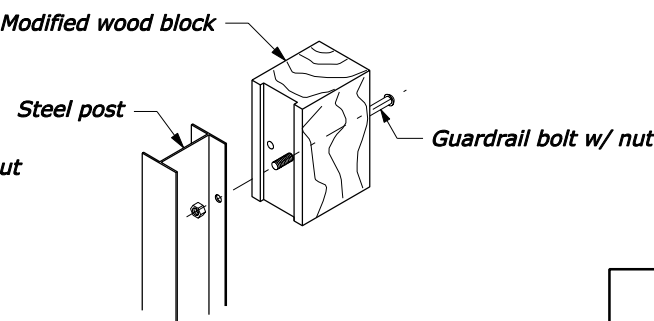
**WOOD POST AND
BLOCK DETAIL**



PLAN



ELEVATION



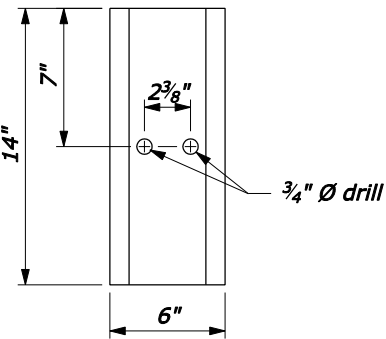
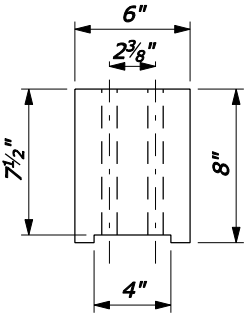
**EXPLODED VIEW
(Rail and washer not shown)**

**STEEL POST
AND BLOCK DETAIL**

NO SCALE

NOTE:

1. See sheet 1 of 2 for terminal layout.
2. For posts #3 and higher match post material of adjacent guardrail run unless otherwise noted.



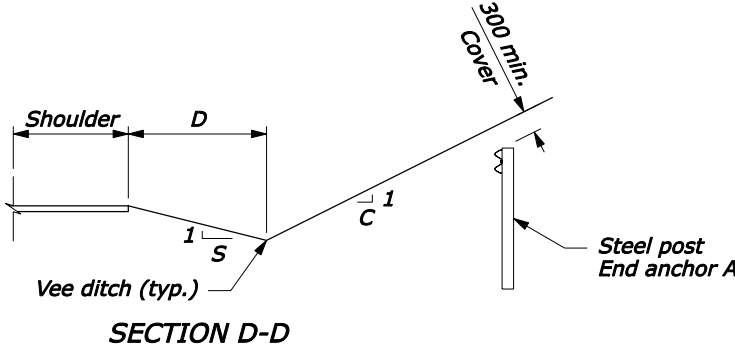
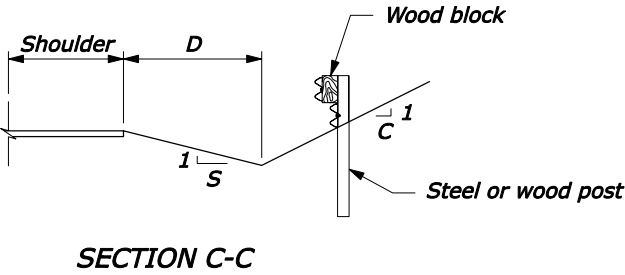
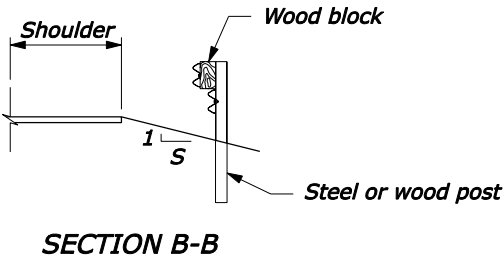
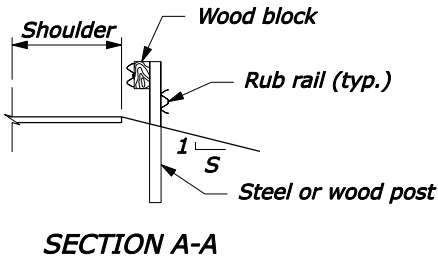
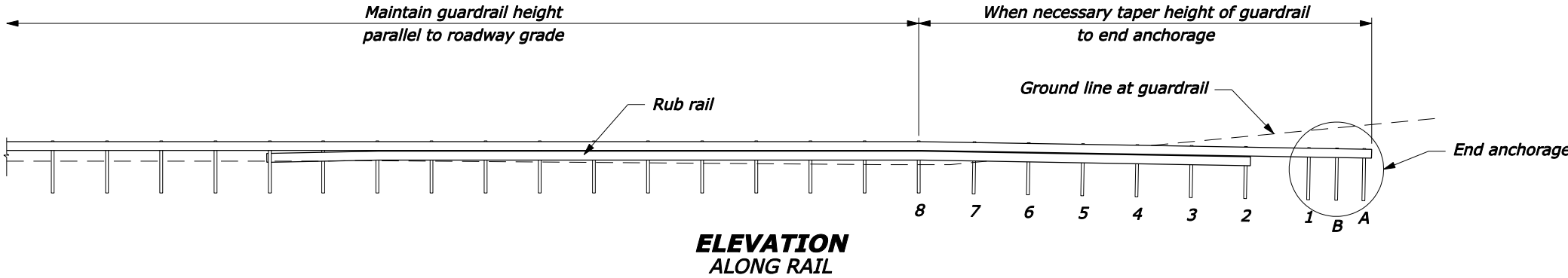
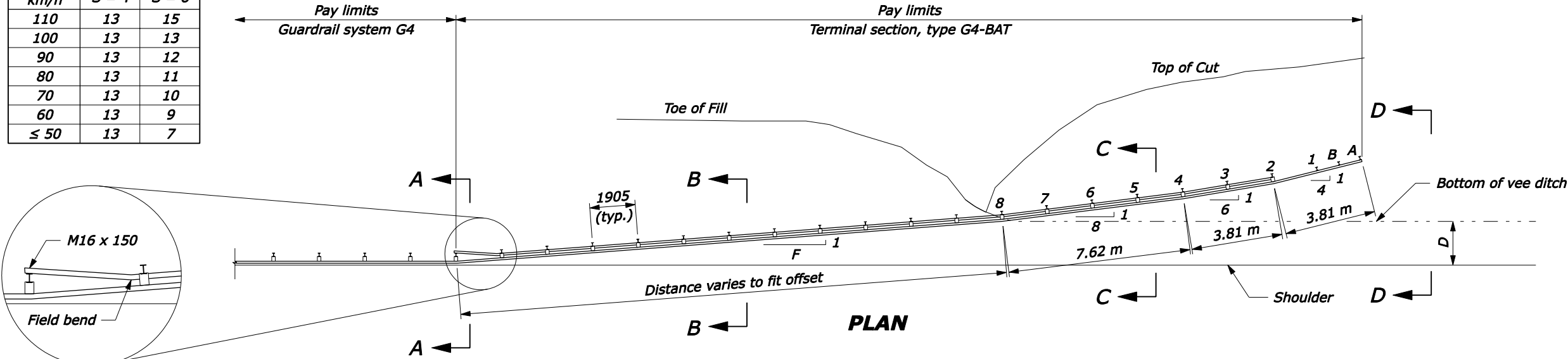
**MODIFIED
WOOD BLOCK**

GUARDRAIL FLARE		
DESIGN SPEED km/h	F	
	S = 4	S = 6
110	13	15
100	13	13
90	13	12
80	13	11
70	13	10
60	13	9
≤ 50	13	7

NOTE:

1. See sheet 2 of 2 for post and block details.
2. Dimensions without units are millimeters.

POST OFFSETS FROM VEE DITCH	
POST	DISTANCE
A	2400
#2	1500
#4	900
#8	0

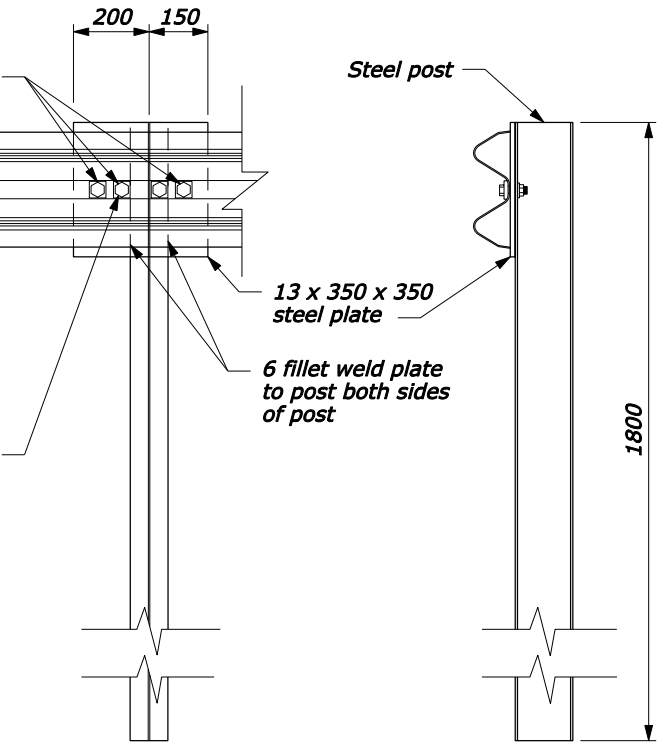


CROSS SECTION DIMENSIONS		
DITCH SLOPE S	DITCH WIDTH D	CUT SLOPE C
4	1830	2
6	2700	4

NO SCALE

3 - 25 ϕ holes to be field drilled in W-beam element and attached with 22 ϕ hex head bolts 36 long each with one square washer and hex nut

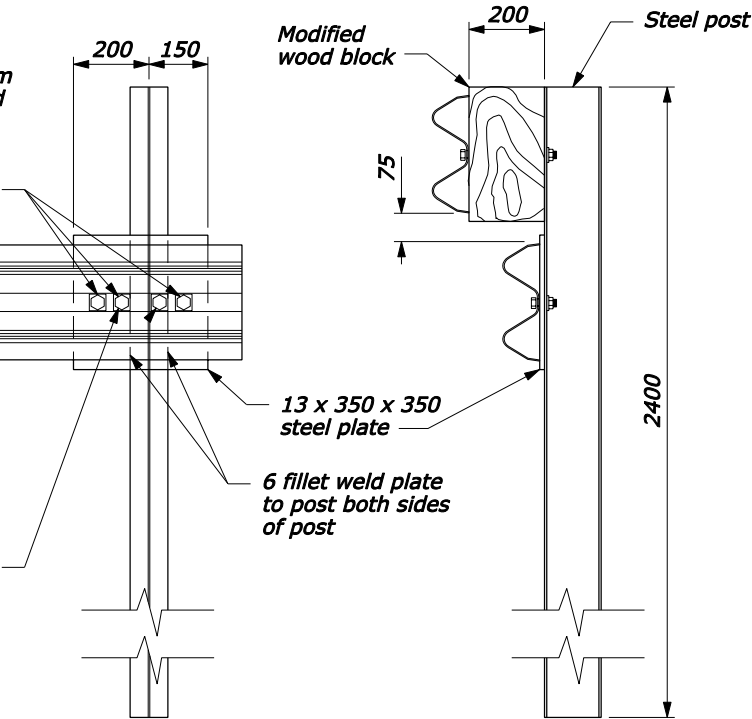
25 ϕ hole to be field drilled through W-beam and through post flange. Attach W-beam with 22 ϕ hex head bolt 50 long with one square washer and hex nut



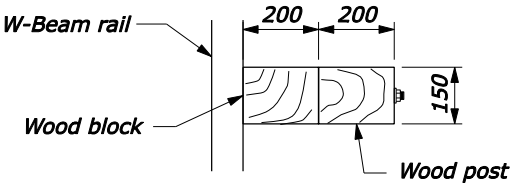
**SPECIAL RAIL TO POST CONNECTION
AT POSTS A, B, AND 1**

3 - 25 ϕ holes to be field drilled in W-beam element and attached with 22 ϕ hex head bolts 36 long each with one square washer and hex nut

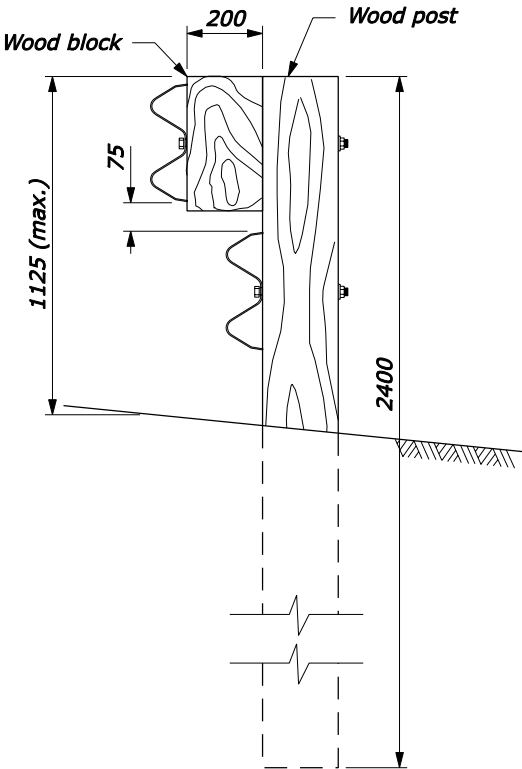
25 ϕ hole to be field drilled through W-beam and through post flange. Attach W-beam with 22 ϕ hex head bolt 50 long with one square washer and hex nut



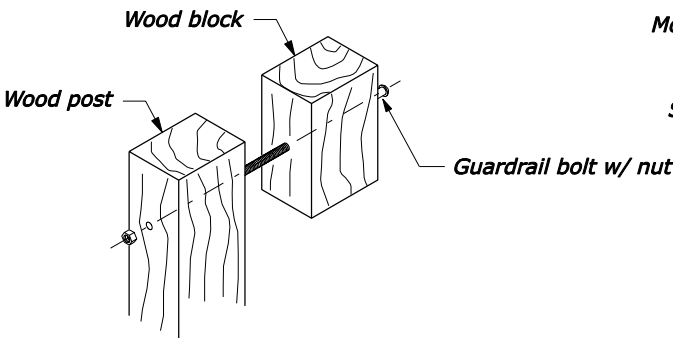
**SPECIAL RUBRAIL TO POST
CONNECTION AT POST 2**



PLAN

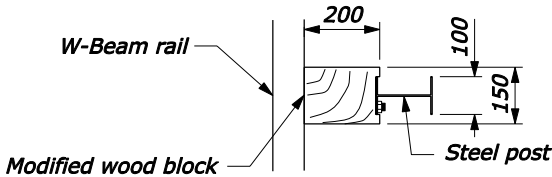


ELEVATION

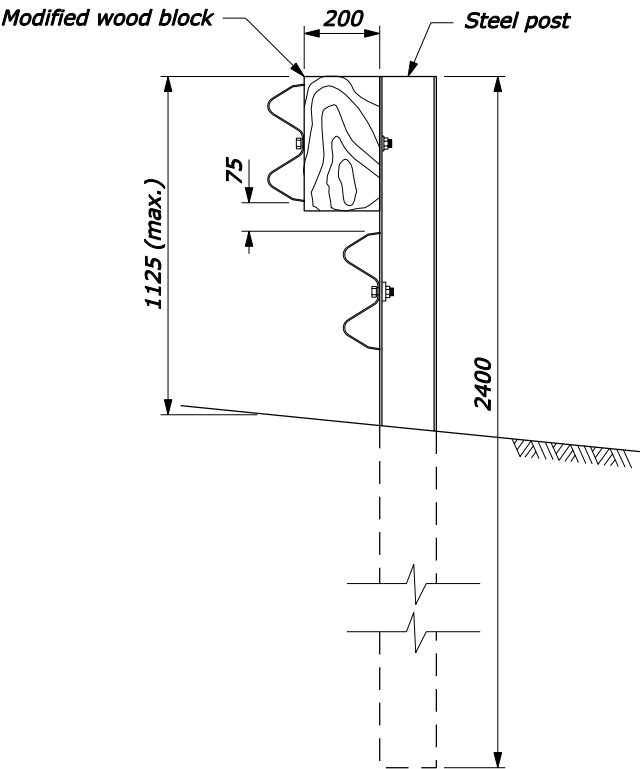


**EXPLODED VIEW
(Rail and washer not shown)**

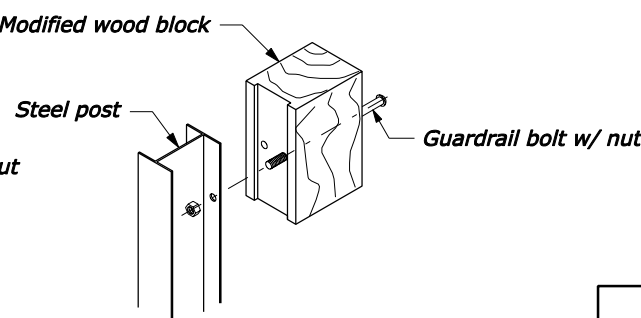
**WOOD POST AND
BLOCK DETAIL**



PLAN



ELEVATION

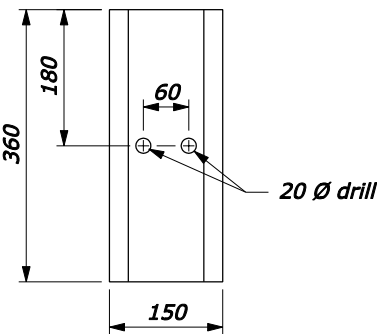
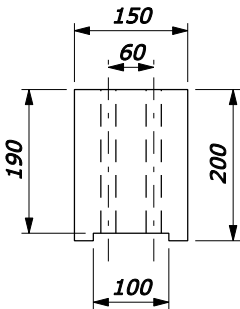


**EXPLODED VIEW
(Rail and washer not shown)**

**STEEL POST
AND BLOCK DETAIL**

NOTE:

1. See sheet 1 of 2 for terminal layout.
2. For posts #3 and higher match post material of adjacent guardrail run unless otherwise noted.
3. Dimensions without units are millimeters.



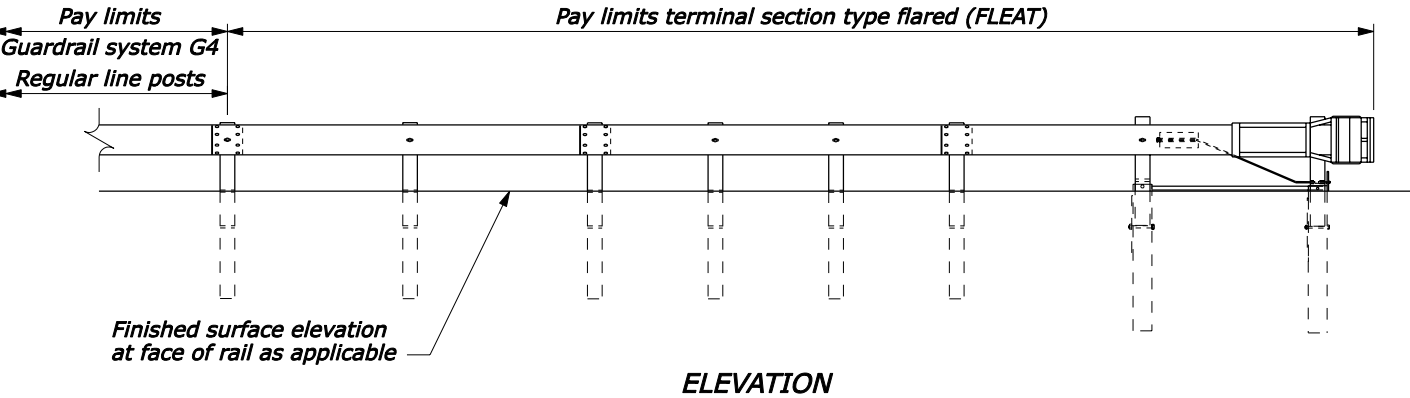
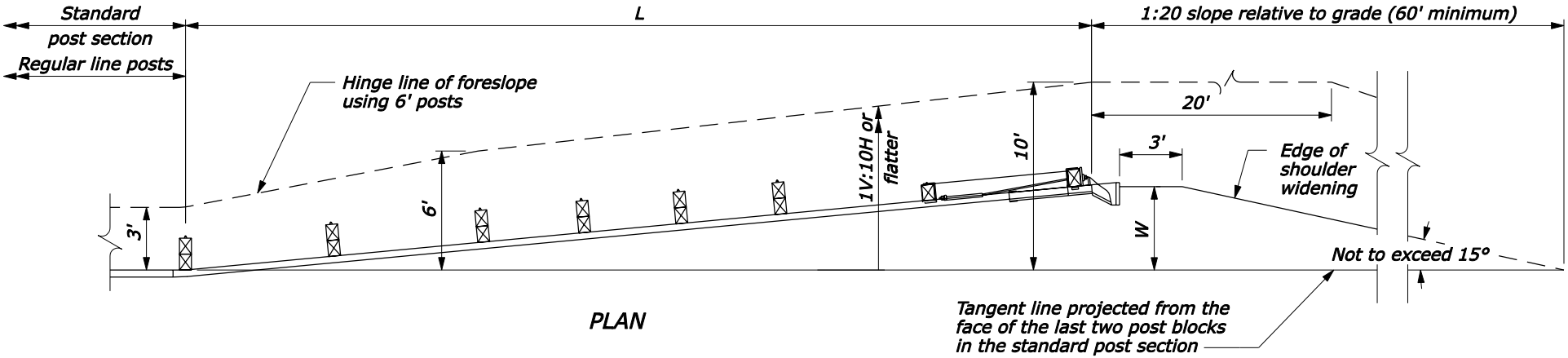
**MODIFIED
WOOD BLOCK**

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY
METRIC STANDARD
**G4 W-BEAM GUARDRAIL BACK
SLOPE ANCHOR TERMINAL
TYPE G4-BAT**
Sheet 2 of 2

STANDARD APPROVED FOR USE 3/1996
REVISED: 6/1997 6/2005

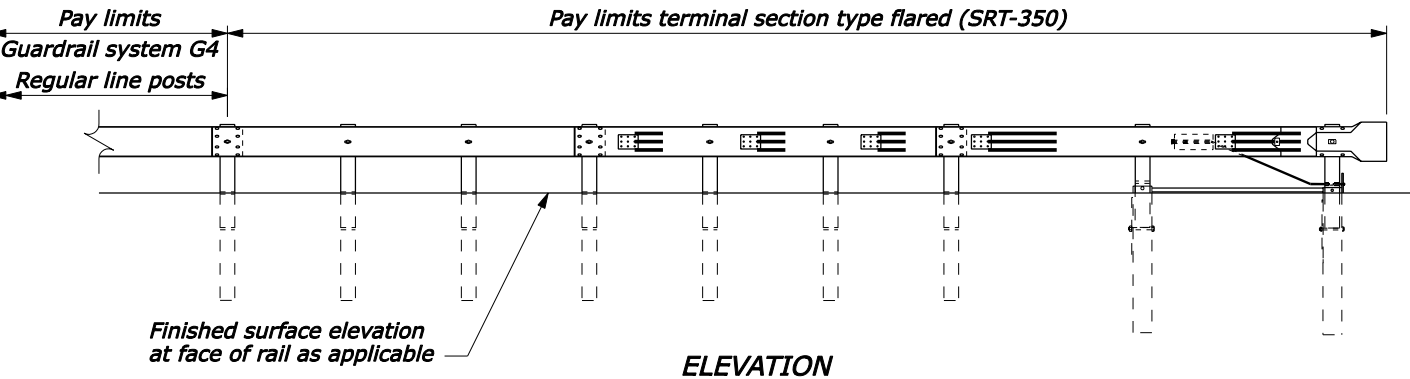
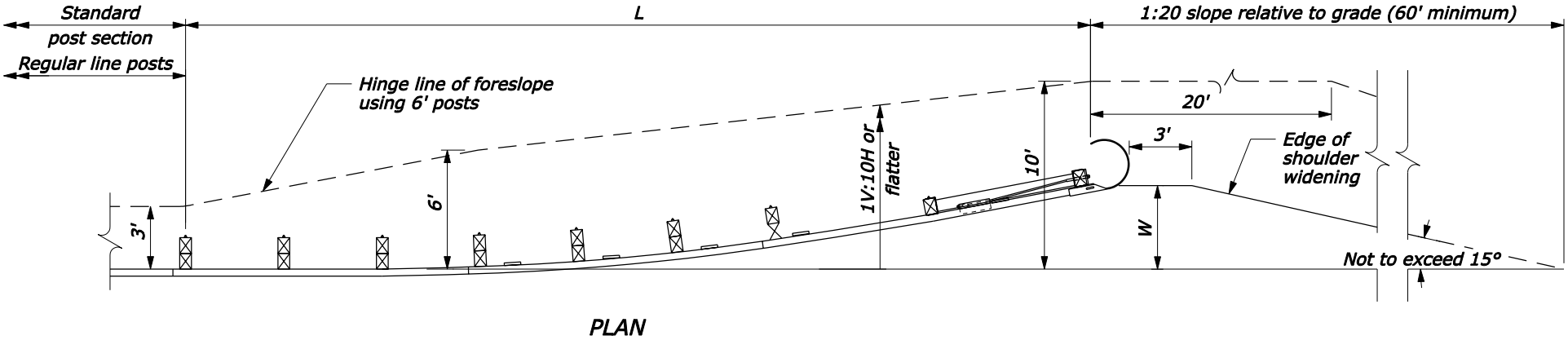
STANDARD
M617-17

NO SCALE



TEST LEVEL	L (ft)	W (ft)
2 (≤ 45 mph)	25.0	1.67-2.67
3 (> 45 mph)	37.5	2.5-4.0

STRAIGHT FLARED OPTION



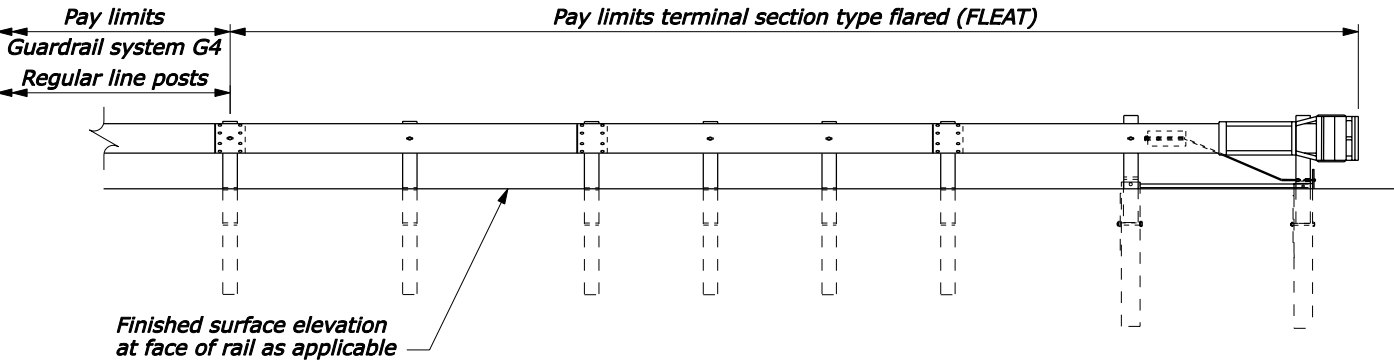
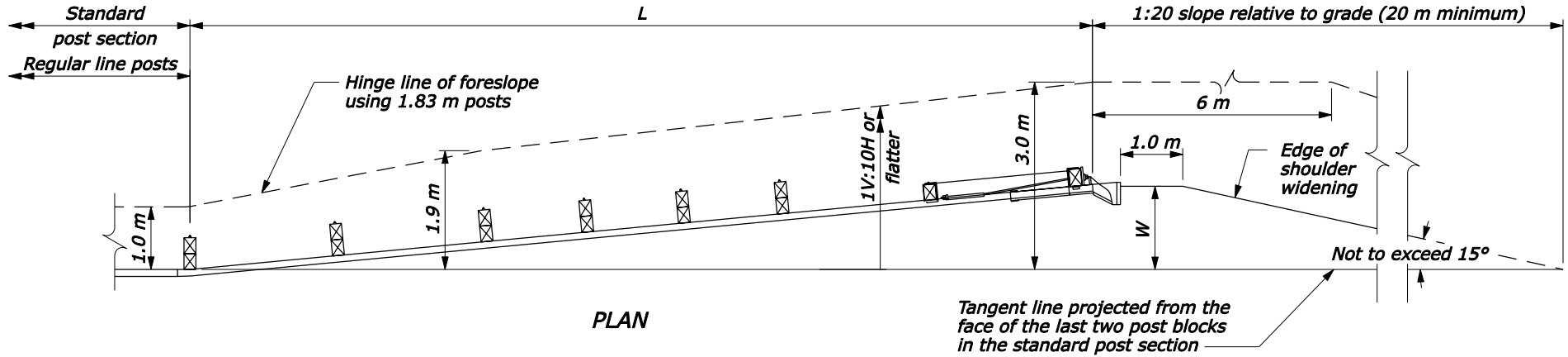
TEST LEVEL	L (ft)	W (ft)
3 (> 45 mph)	37.5	3.0 or 4.0

PARABOLIC FLARED OPTION

NOTE:

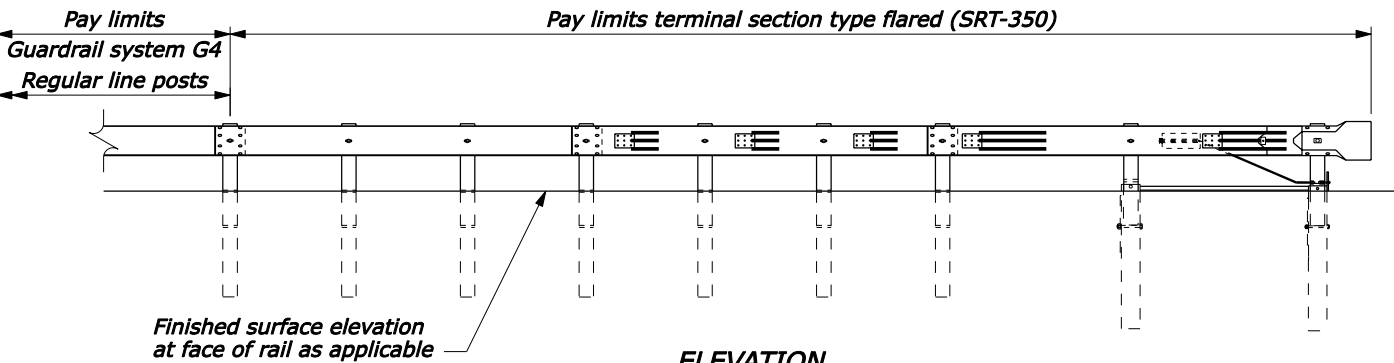
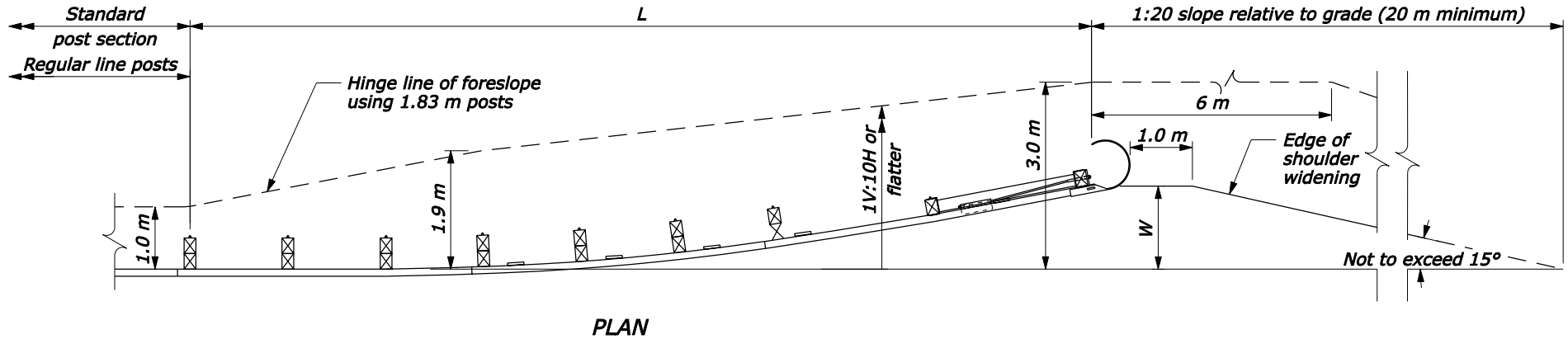
1. Install a G4 W-beam guardrail terminal that meets NCHRP-350 requirements per manufacturer's recommendations. Ensure that terminal meets appropriate test level for the project.
2. Where terminal is placed on a curve, and post offsets would result in the rail encroaching onto the shoulder (e.g., the inside of a curve), install the posts so that the face of the rail is at the edge of the shoulder.
3. Pave widened shoulder on both ends of guardrail runs when indicated on the plans.
4. See manufacturer's drawings for other details.

NO SCALE



TEST LEVEL	L (m)	W (m)
2 (≤ 70 km/h)	7.62	0.51-0.81
3 (> 70 km/h)	11.43	0.76-1.22

STRAIGHT FLARED OPTION



TEST LEVEL	L (m)	W (m)
3 (> 70 km/h)	11.43	0.9 or 1.22

PARABOLIC FLARED OPTION

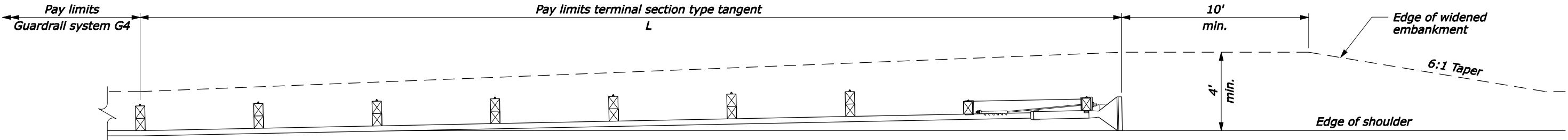
NOTE:

1. Install a G4 W-beam guardrail terminal that meets NCHRP-350 requirements per manufacturer's recommendations. Ensure that terminal meets appropriate test level for the project.
2. Where terminal is placed on a curve, and post offsets would result in the rail encroaching onto the shoulder (e.g., the inside of a curve), install the posts so that the face of the rail is at the edge of the shoulder.
3. Pave widened shoulder on both ends of guardrail runs when indicated on the plans.
4. See manufacturer's drawings for other details.

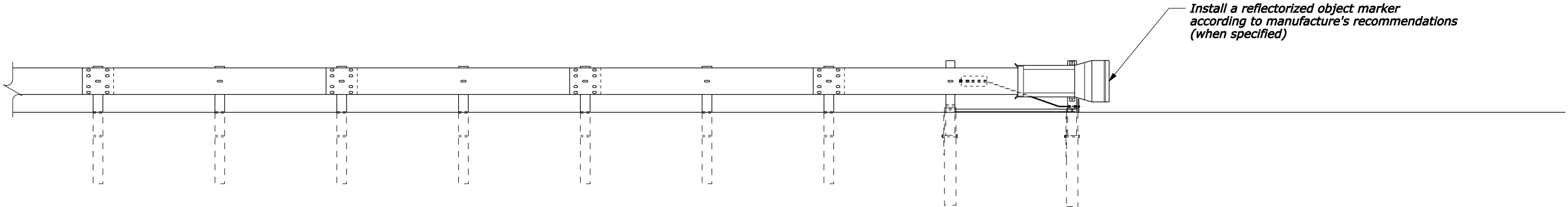
NO SCALE

NOTE:

- 1. Install a G4 W-beam guardrail terminal that meets NCHRP-350 requirements per manufacturer's recommendations. Ensure that terminal meets appropriate test level for the project.
- 2. Install terminal at a 1:50 taper, ensuring that end piece is entirely off shoulder.
- 3. See manufacturer's drawings for other details.



PLAN



ELEVATION

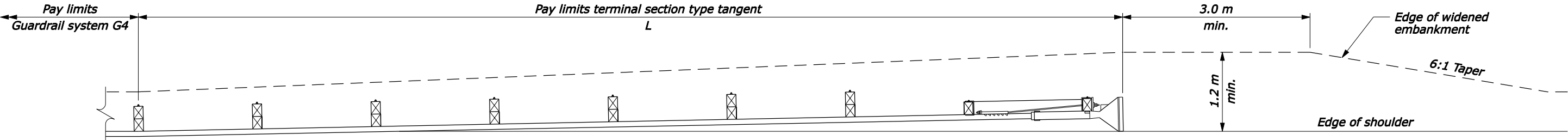
TEST LEVEL	L (ft)
2 (≤ 45 mph)	25
3 (> 45 mph)	37.5 or 50

NO SCALE

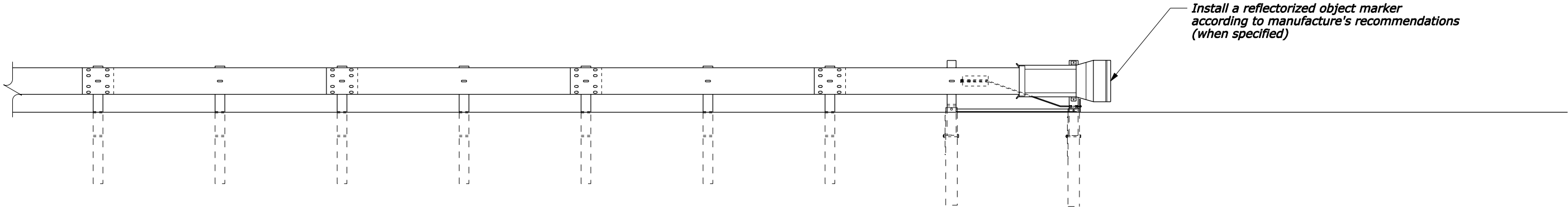
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD	
G4 W BEAM GUARDRAIL TYPE TANGENT TERMINAL	
STANDARD APPROVED FOR USE 6/2005	STANDARD
REVISED:	617-20

NOTE:

1. Install a G4 W-beam guardrail terminal that meets NCHRP-350 requirements per manufacturer's recommendations. Ensure that terminal meets appropriate test level for the project.
2. Install terminal at a 1:50 taper, ensuring that end piece is entirely off shoulder.
3. See manufacturer's drawings for other details.



PLAN

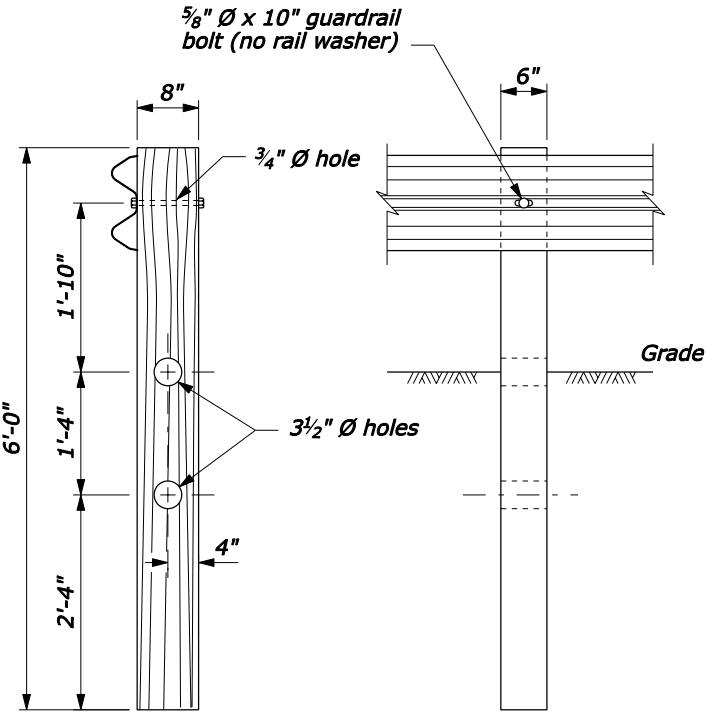
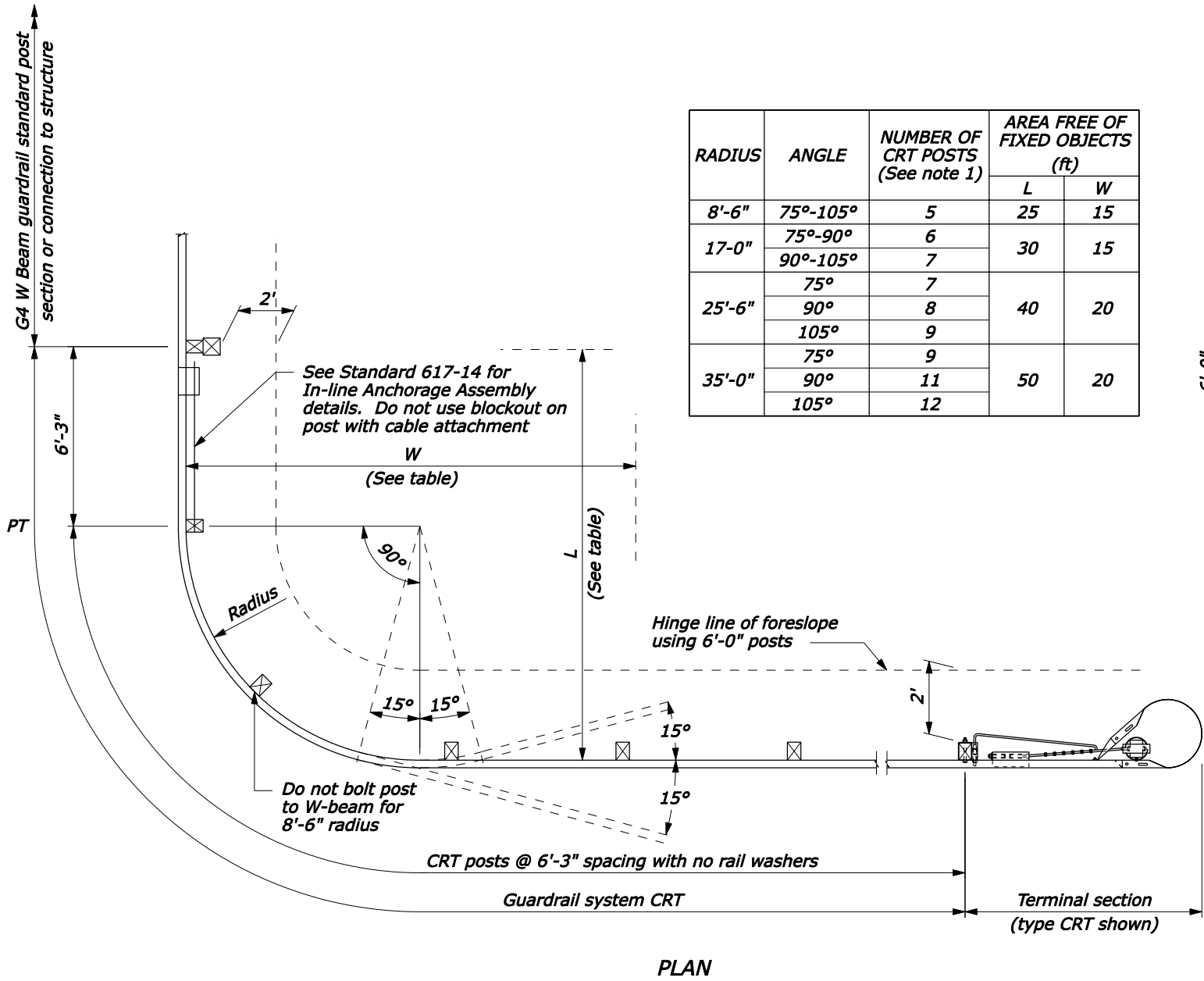


ELEVATION

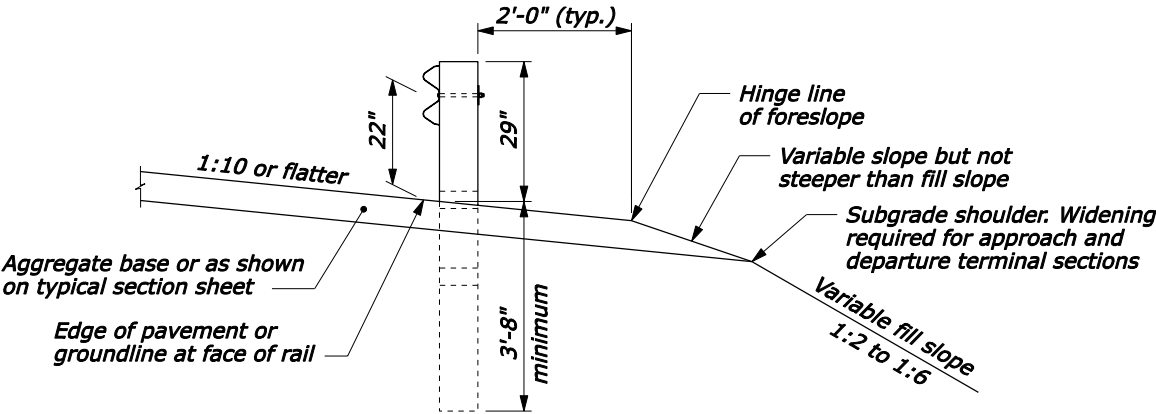
TEST LEVEL	L (m)
2 (≤ 70 km/h)	7.62
3 (> 70 km/h)	11.43 or 15.24

NO SCALE

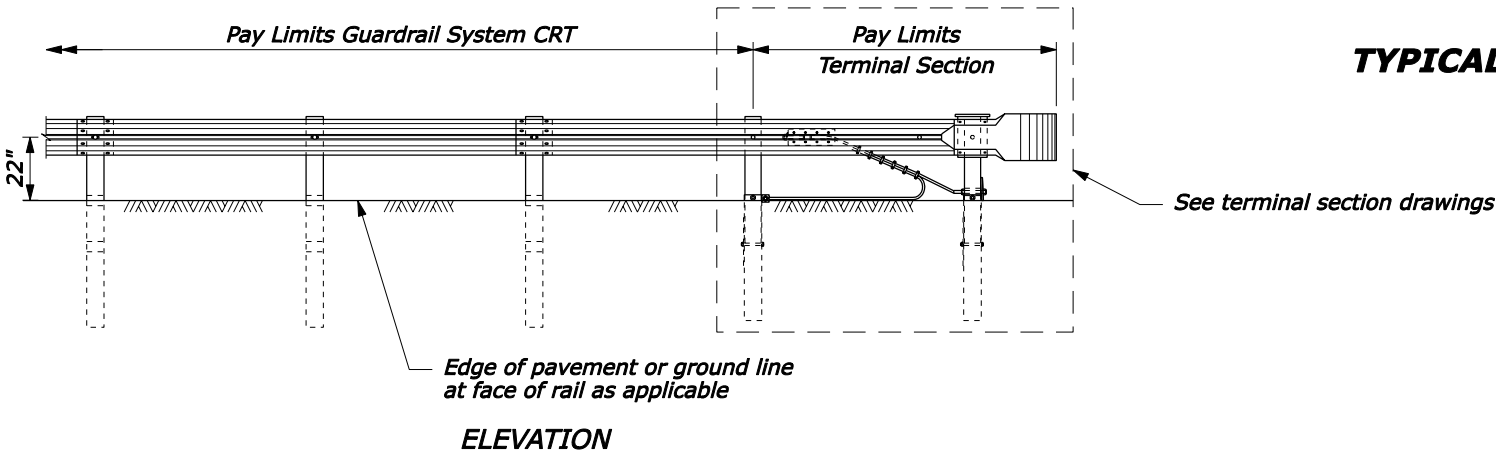
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
METRIC STANDARD	
G4 W BEAM GUARDRAIL TYPE TANGENT TERMINAL	
STANDARD APPROVED FOR USE 6/2005	STANDARD
REVISED:	M617-20



CRT POST DETAIL



TYPICAL GUARDRAIL CROSS SECTION



GUARDRAIL SYSTEM CRT
WITH CRT POSTS

NO SCALE

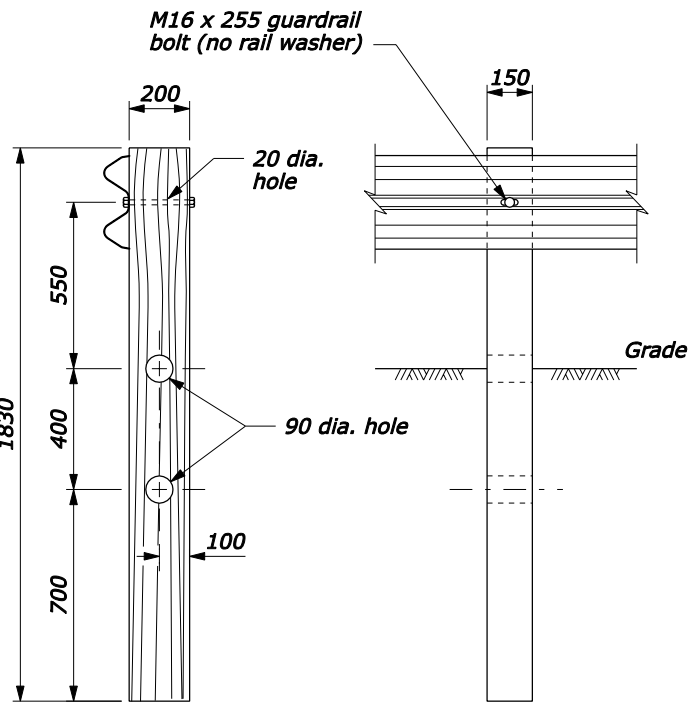
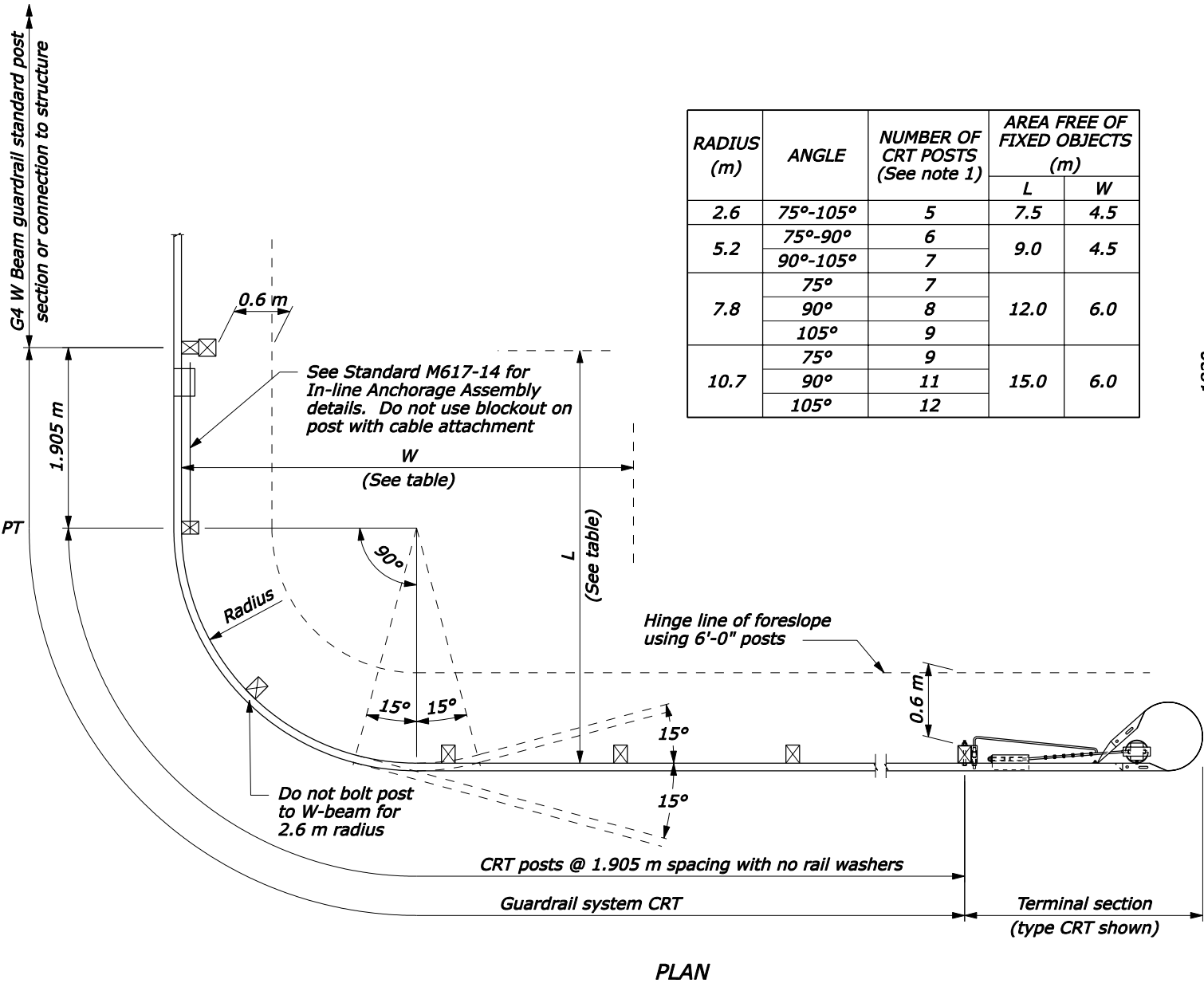
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

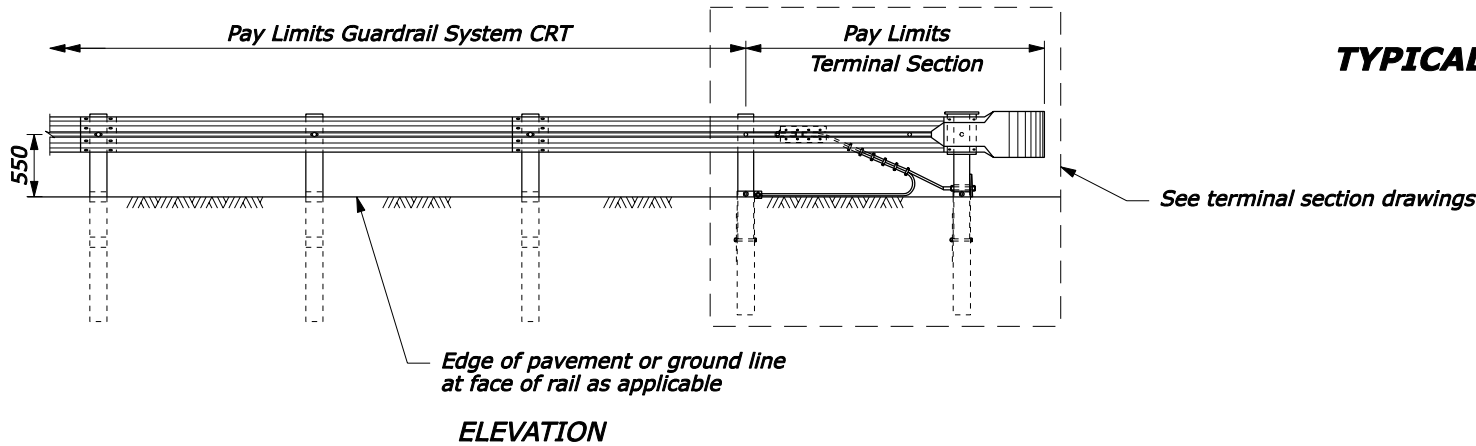
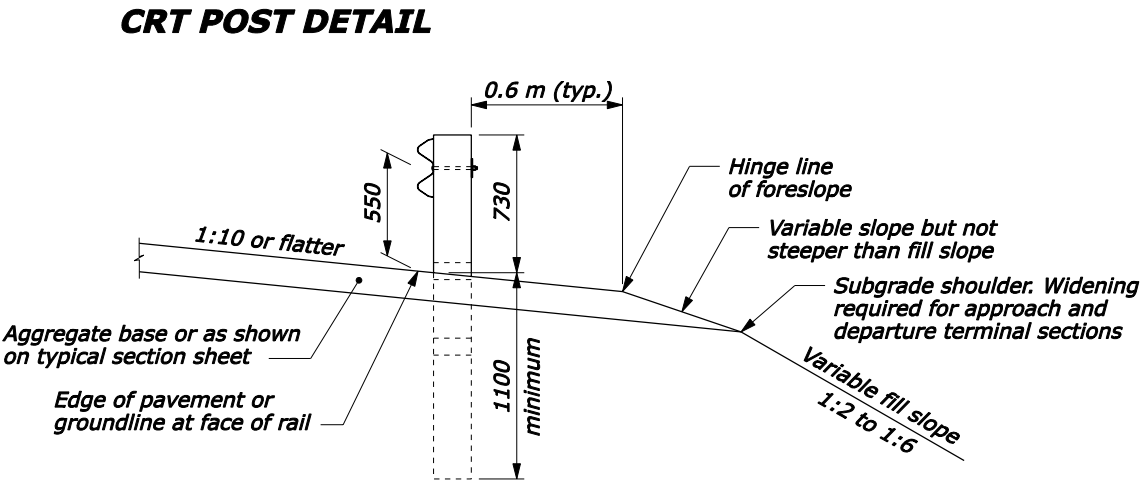
CRT W-BEAM GUARDRAIL
WOOD POSTS

STANDARD APPROVED FOR USE 1/1994
REVISED: 4/1994 6/2005

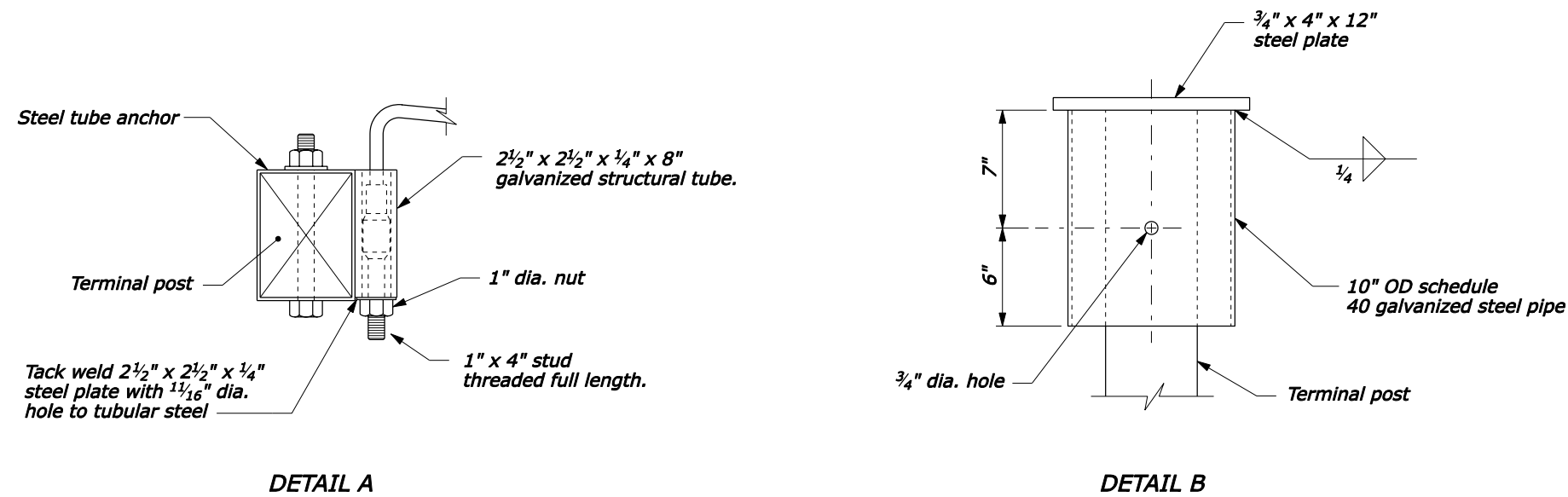
STANDARD
617-21



- NOTE:**
- CRT posts include those posts between the terminal and PT, plus the post w/blockout at the In-line anchor.
 - See Standard M617-22 for terminal section, Type CRT details. The use of this terminal is limited to driveways, road approaches and low speed minor road connections. Do not use on mainline roadways.
 - Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance, and accepted manufacturing practices.
 - Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are not available.
 - Dimensions without units are millimeters.

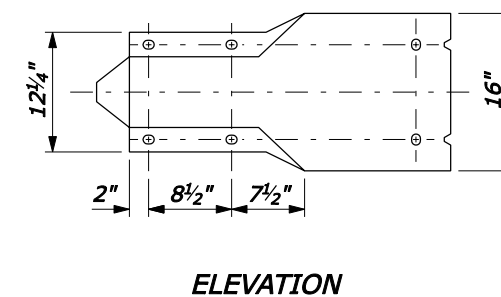
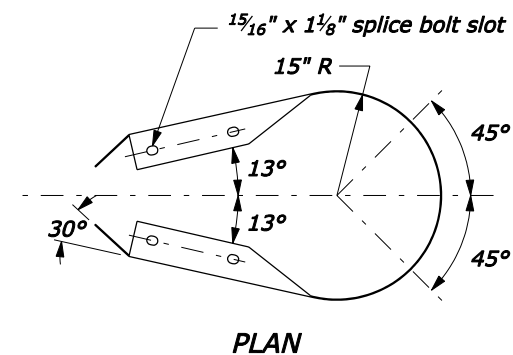
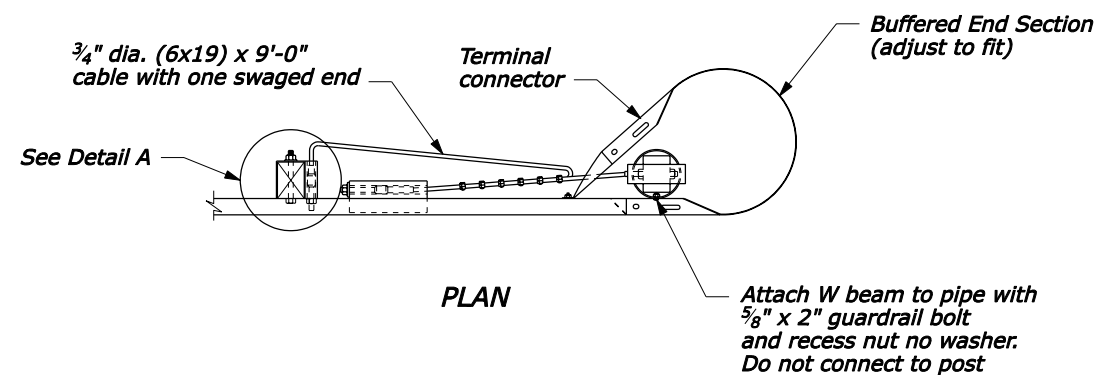


NO SCALE

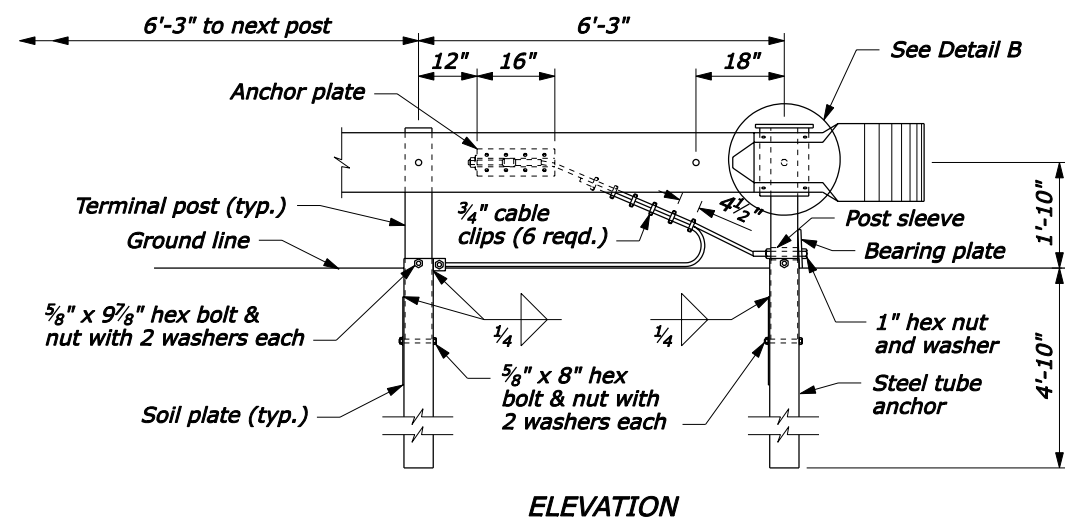


NOTE:

1. See Standard 617-15 for other details.
2. Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance, and accepted manufacturing practices.



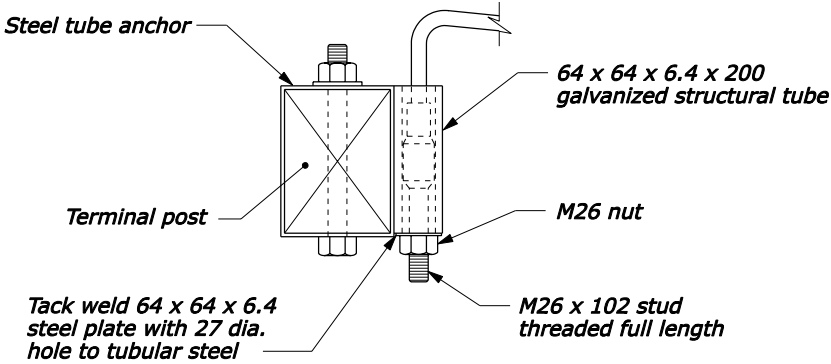
BUFFERED END SECTION



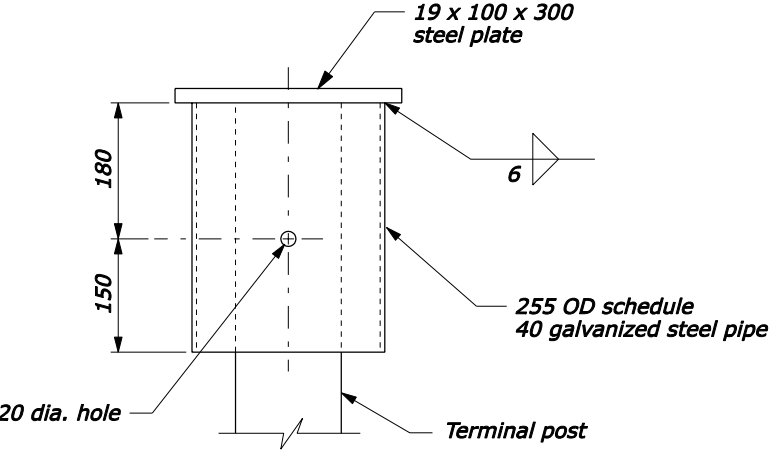
ANCHORAGE ASSEMBLY

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD CRT W-BEAM GUARDRAIL CABLE RELEASING TERMINAL CRT ANCHORAGE ASSEMBLY	
STANDARD APPROVED FOR USE 1/1994 REVISED: 4/1994 6/2005	STANDARD 617-22



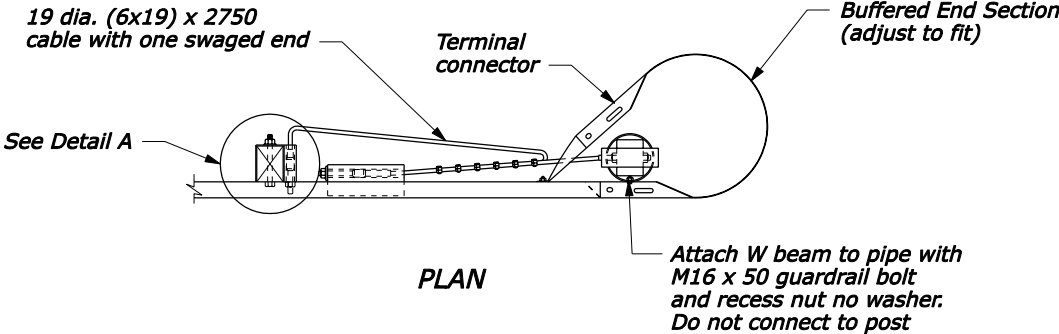
DETAIL A



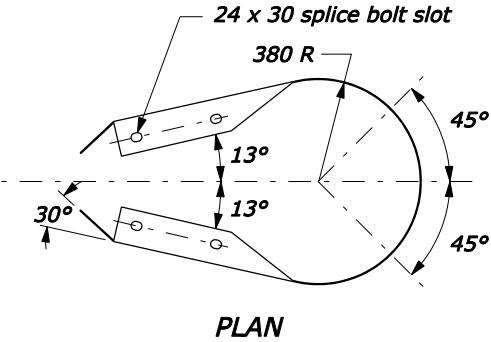
DETAIL B

NOTE:

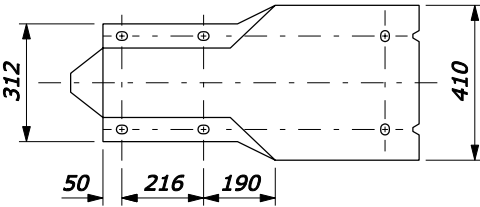
1. See Standard M617-15 for other details.
2. Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance, and accepted manufacturing practices.
3. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are not available.
4. Dimensions without units are millimeters.



PLAN

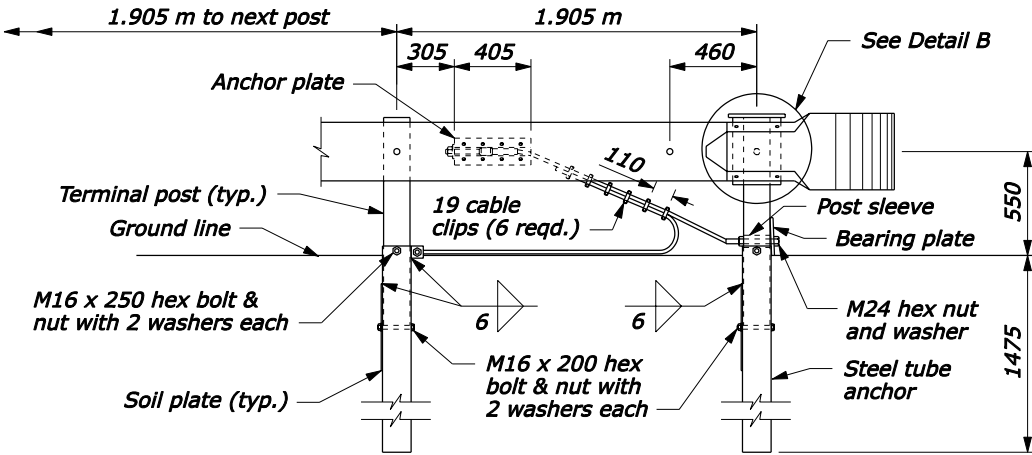


PLAN



ELEVATION

BUFFERED END SECTION



ELEVATION

ANCHORAGE ASSEMBLY

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
METRIC STANDARD	
CRT W-BEAM GUARDRAIL CABLE RELEASING TERMINAL CRT ANCHORAGE ASSEMBLY	
STANDARD APPROVED FOR USE 3/1996 REVISED: 6/2005	STANDARD M617-22